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ABSTRACT

The purpose of the "Learning for a Sustainable Environment: Innovations in Teacher Education" project is to expand the range of innovative practices used in teacher education programs in the Asia-Pacific region. The project helps teacher educators develop the skills for introducing teachers and teachers-in-training to the concepts, curriculum planning skills, and teaching methodologies of environmental education. Designed to be conducted in three stages, the project was nearing the end of Stage 2 when the regional seminar was held in 1996. This document reports on that seminar, the broad goals of which were to evaluate the professional development process and modules from Stages 1 and 2 and develop collaborative plans for Stage 3. Contents are as follows: Executive Summary; Chapter 1--"Introduction"; Chapter 2--"Synthesis of Country Reports"; Chapter 3--"Learning for a Sustainable Environment"; Chapter 4--"Evaluation of the Action Research Network Process for Professional Development"; Chapter 5--"Evaluation and Revision of the Project Modules"; Chapter 6--"Proposals for Stage 3"; Chapter 7--"Recommendations"; and an 11-item reference list. Appendices contain a list of participants, country reports, and sample completed project review guides from the Philippines and Fiji. (PVD)

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Learning for a Sustainable Environment

Teacher Education and Environmental Education in Asia and the Pacific

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National Institute for Educational Research (NIER)
December 1996

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Learning for a Sustainable Environment:

Teacher Education and Environmental Education in Asia and the Pacific

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Executive Summary

"Learning for a Sustainable Environment: Innovations in Teacher Education" is an Asia-Pacific professional development project co-directed by UNESCO-ACEID and Griffith University. The project was developed following a NIER-ACEID seminar on Environmental Education and Teacher Education in Asia and the Pacific in 1993. This project has developed an action research network in the region. Network members have shared in writing carefully-researched and evaluated, and culturally-sensitive, workshop modules for use in pre- and in-service environmental education programmes. A project dissemination programme has assisted network members to analyse and adapt these modules in accordance with local cultural and educational needs and to prepare action research case studies of their use of the materials in their own continuing professional development. In this way, the project has created a growing, active network of innovative teacher education practitioners in environmental education in the region.

This professional development process for teacher educators was designed to help them incorporate into their programmes knowledge and skills which can help teachers to introduce and improve environmental education in their classrooms. It is also hoped that promotion of the innovative teaching strategies of environmental education may also improve the quality of learning in other areas of the curriculum.

The purpose of the 1996 NIER-ACEID seminar was to evaluate the progress of the "Learning for a Sustainable Environment: Innovations in Teacher Education" project. Participants at the seminar endorsed the professional development processes and outcomes of the action research network, and made valuable recommendations for the revision of the draft project modules into a generic regional teacher education manual. It is intended that this manual and the skills developed by network members will be used to develop nation-level action research networks in the countries of the region which will continue the professional development processes of this project at the national and district scales.

The three recommendations of the seminar are:

1. That the project should continue into Stage 3 with the formation and expansion of national professional development projects for environmental education in teacher education supported by regional networking activities.
2. That NIER should continue to support and monitor the project through continued technical advice and convening a seminar in two years time to evaluate Stage 3.
3. That the action research network approach to professional development in teacher education trialed and evaluated in this project be considered by UNESCO and other international agencies as a proven process for cross-national collaboration in the dissemination of educational innovations. This could include other regions replicating this project in environmental education and/or applying the process to other educational innovations, e.g. teacher education for peace.

Chapter 1: Introduction

Background

A UNESCO Asia-Pacific Programme of Educational Innovation for Development (APEID) seminar on "Environmental Education and Teacher Education in Asia and the Pacific" was held at, and sponsored by, the National Institute for Educational Research (NIER), Tokyo from 20 October to 5 November 1993. This seminar examined the provision of environmental education within the formal school curriculum of 15 countries in the region and the issues related to the provision of teacher education to support environmental education in schools.

The seminar found that environmental education was developing into a very important aspect of the curriculum throughout the region. This was because of the need to address the environmental and social tensions that have flowed from the process of industrialisation and modernisation. Environmental education was seen as a key curriculum initiative to help redress environmental concerns and to maintain and enhance traditional cultural values of respect for nature. However, the NIER seminar also found that teachers in most countries in the region were generally not well prepared for their roles as environmental educators. This was because environmental education was not a core element of pre-service teacher education programmes in the countries of the region. Few countries had organised in-service education training activities or postgraduate programmes in environmental education to help address this problem.

Thus, the report of the 1993 NIER/APEID seminar on "Environmental Education and Teacher Education in Asia and the Pacific" provided a range of guidelines for Member States on ways of integrating environmental education content and professional competencies into the teacher education curriculum. The key recommendation of this seminar called for ACEID to develop a three stage professional development project for teacher educators to help them develop the skills with which to promote the development of environmental education in the Asia and the Pacific region. The three proposed stages were:

Stage 1 Development of prototype teacher education materials for EE;

Stage 2 Trial and revision in representative countries in the region; and

Stage 3 Region-wide implementation.

This recommendation was in accord with the focus on competencies for the environmentally educated teacher identified at the UNESCO "Asia-Pacific Regional Seminar on Overcoming the Barriers to Environmental Education through Teacher Education" held at Griffith University in Brisbane from 4 to 9 July 1993. The recommendation of the Tokyo seminar was also adopted by the 6-9 December 1993 SEAMEO-UNESCO sub-regional conferences on "Environmental Education and Secondary Education" held in Penang, Malaysia.

Under joint project directors, Dr. Rupert Maclean, the Chief of the Asia-Pacific Centre of Educational Innovation for Development (ACEID), and Dr. John Fien, the Director of the Centre for Innovation and Research in Environmental Education of Griffith University, Australia, ACEID has since sponsored a project called ***Learning for a Sustainable Environment: Innovations in Teacher Education*** as an APEID project to implement this recommendation of the 1993 Tokyo meeting. A planning meeting on the project was hosted by Griffith University in June 1994. A process for implementing the three-stage project recommended at the NIER seminar was developed and initiated with financial support from APEID, the Australian Government and NIER.

The purpose of the *Learning for a Sustainable Environment: Innovations in Teacher Education* project is to expand the range of innovative practices used in teacher education programmes in the Asia-Pacific region by helping teacher educators develop the skills for introducing teachers and teachers-in-training to the concepts, curriculum planning skills and teaching methodologies of environmental education.

Stage 1 of the project saw the creation of a network of teacher educators in the region who shared in the development of prototype workshop modules for use in both pre-service and in-service teacher education programmes. Nine workshop modules were written in Stage 1. These were revised, after input was received from a panel of critical friends nominated from over 20 countries in the region.

Stage 2 began with a training course in Pattaya, Thailand in June 1995 in which teacher educators from a number of countries in the region began the adaptation, trial and evaluation of these workshop modules. An accompanying *Review Guide* assisted teacher educators to adapt the modules in accordance with local needs, and to prepare action research case studies of their use of the materials and their own continuing professional development. Countries involved included: Australia, Fiji, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Taiwan, Thailand and Vietnam.

The project was nearing the end of Stage 2 in 1996, and reports on the trials of the nine workshop modules in a range of teacher education programmes in the countries in the region were written, following guidelines provided by the project office. The broad goals of this 1996 seminar were to evaluate the professional development process and modules from Stage 1 and 2, and to develop collaborative plans for Stage 3.

Objectives

The objectives of the seminar were:

A. To allow participating countries to report on actions taken to promote teacher education for environmental education that have been undertaken since the 1993 NIER Tokyo seminar, and to share the ideas, materials and strategies that have been successful.

B. To share the results of the APEID project, *Learning for a Sustainable Environment: Innovations in Teacher Education* through the:

- Dissemination of reports on the trialing and evaluation of the workshop materials;

- Review of the revised modules and development of plans for publication and associated Stage 3 professional development activities in the countries of the region; and
- Development of principles for future intra-regional co-operation in the development of environmental education in teacher education.

C. To introduce new participants to the project and provide them with training in writing and evaluating environmental education workshop materials for use in teacher education.

Participants

Nineteen participants from 14 countries/territories took part in the seminar. They were from Australia, China, Fiji, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Philippines, Republic of Korea, Thailand and Vietnam. UNESCO-PROAP was represented by Dr. Rupert Maclean, Chief, Asia and the Pacific Centre of Educational Innovation for Development. UNESCO-HQ was represented by Dr. Richard Halperin, Chief, Section for Secondary and Teacher Education, Education Sector.

A list of participants, observers and the NIER Secretariat is provided in Annex 1.

Inauguration

On the first day of the seminar, addresses were made by Mr. Yukihiko Hishimura, Director-General of NIER, Mr. Yoshio Keisuke, Director, Educational and Cultural Exchange Office, Science and International Affairs Bureau, Ministry of Education, Science, Sports and Culture (Monbusho) of Japan, and Mr. Richard Halperin, UNESCO-HQ, Paris.

Nomination of Officers

Dr. John Fien of Australia was nominated as Seminar Chairperson. He was assisted by several participants who chaired plenary sessions, including Dr. Angelina Galang, Mrs. Premila Kumar, Mrs. Farrah Parvais Saleh, Dr. M. J. Ravindranath, Mrs. Pauziah Abd. Wahab, Ms Debbie Heck and Mr. Barry Law.

Seminar Procedures

The seminar conducted its work in plenary as well as group sessions. After the presentation of country reports, the participants worked in a number of groups, with membership changing to suit the needs of the topics and tasks. Seminar participants adopted the roles of group facilitators, secretaries and reporters as required. Sessions covered:

- Analysis of country reports;
- Evaluation of the professional development process used in the project;
- Evaluation and revision of the project modules; and
- Proposals for Stage 3.

Closing

The draft final report was presented to the seminar at the final working session on 13 November, 1996 and was adapted with minor revisions.

Chapter 2: Synthesis of Country Reports

Introduction

Participants from all attending countries presented reports on developments in teacher education for environmental education since 1993. In summary, they reported an extensive range of innovations and expanded opportunities. However, they indicated that the developments were mostly "piecemeal" and not widespread or co-ordinated in any one country or across the region.

Participants stressed that the current priority for environmental education is to consolidate and institutionalise teacher education efforts to ensure that all teachers recognise their potential as environmental educators. This requires detailed planning and co-ordination at the national and institutional levels at both the pre-service and in-service stages. Teacher education should complement national goals and strategies for environmental education in the formal school system and in non-formal education. The need for such a complementary framework reflects a general need for co-ordination of environmental education at the national level.

Initiatives and Developments in the Region

Participants noted that a pattern of increased activity in environmental education had become widespread across the region since 1993, the time of the last NIER Seminar on Environmental Education and Teacher Education in Asia and the Pacific. Country Reports in 1996 indicated that this was influenced, at least in part, by the expansion of scientific knowledge about the environment and increased public awareness of the increasing severity of environmental problems.

These developments have led to increased national and international activity in the formulation of strategies for sustainable development. Many countries indicated that Ministries for the Environment who have the responsibility for natural resources management have sought to implement relevant Agenda 21 recommendations of the United Nations Conference on Environment and Development (UNCED) for sustainable environmental management. Many countries also reported increases in environmental reporting in the mass media, an expansion of the number of environmental NGOs, a greater cross-sectional involvement in environmental management, an increase in the 'greening' of industry and commerce, and high levels of public involvement in, and responses to, environmental campaigns. Activities such as these reflect growing public awareness, interest and concern for the environment, and a recognition of the dynamic nature of environmental issues.

Educational systems are responding to this through increasing support for environmental education in schools and non-formal education (although not as rapidly as many country delegates would like). In some countries, there has been a great increase in the development of environmental education guidelines by education ministries, the adoption of whole-school approaches to curriculum planning for environmental education, the revision of syllabuses to infuse environmental perspectives, and the development of specific environmental education syllabi. Many countries reported an increased supply of environmental education teaching resources - although the materials being developed are still not sufficient and in many cases vary in quality. Some countries reported the development of specialist environmental education centres which provided model outdoor learning experiences for students and/or curriculum and professional development support for teachers.

NGOs, environment and natural resource agencies, private companies and the media are also providing support for environmental education in schools. Environmental education associations are developing and are very active in some countries. These associations provide a lot of support to teachers and are active in encouraging government, NGO and public involvement in environmental education initiatives. Finally, in some countries, environmental education in schools has been assisted by the development of evaluation and research programmes.

These developments in public environmental awareness, environmental policy and environmental education have stimulated developments in teacher education in environmental education. This is reflected in developments at the pre-service, post-graduate and in-service level.

At the pre-service level, environmental education has been introduced as an elective in almost all countries. It has been made compulsory throughout some countries (e.g. Malaysia; Republic of Korea and Indonesia), and is also compulsory in some institutions in a few countries. The reports highlighted that even though environmental education has become part of teacher training programmes in many countries it is not a strong thrust. In Fiji, for example, environmental education is offered as an option. In Malaysia environmental education subjects carry less grade point than traditional subjects. However, the priority is to make environmental education compulsory in teacher education programs at the national level.

At the post-graduate level, there has been an increase in the number of institutions offering graduate degrees in environmental education, Masters' degrees are now offered in Australia, China, Fiji, Hong Kong, Indonesia, Philippines, Malaysia, Thailand and Vietnam. Doctoral degrees in environmental education are also offered in Australia, Hong Kong, India, Indonesia and Thailand.

At the in-service level, financial and technical support from governmental ministries, NGOs and international organisations has led to a number of environmental education programmes. National professional development programs are in place in several countries, including, for example, Australia, China, Republic of Korea, Japan, Indonesia and Vietnam. Many teacher-training institutions have increased their in-service activities in environmental education. For example, in the Philippines, the voluntary efforts of one educational group based in a tertiary institution have resulted in effective outreach training programs. The inclusion of administration teams within the in-service courses has facilitated the development of environmental education in a number of institutions.

The participants believed that the UNESCO-ACEID project module "*Learning for a Sustainable Environment*" has made an initial impact in the region. The modules provided a range of innovative practices for the professional development of teacher educators. The ongoing development and revision of the modules has resulted in the creation of a regional network of teacher educators that promotes environmental education.

Issues and Problems Facing Environmental Education in Teacher Education

Despite these achievements, the Country Reports identified a number of outstanding issues and problems which face teacher education for environmental education at both pre-service and in-service levels.

Many national reports disclosed that many initiatives to promote environmental education came from Ministries for Environment rather than Ministries of Education. The lack of strong involvement from government Education Departments has tended to marginalise environmental education from mainstream education policy, and most countries lack a coherent plan for progression in environmental education from kindergarten to college level. Thus, environmental education is often not a curriculum priority at the school level where the curriculum is over-crowded.

The low profile of environmental education in external examinations also contributes to its lack of status in schools. Therefore, it is not surprising to find that many teachers and teacher educators do not perceive environmental education as a curriculum priority, or that it is difficult to attract teachers to become involved in environmental education.

In some countries there are no national policies or guidelines for teacher education in environmental education. The result of this has been a lack of coherent strategies and long-term planning for teacher education for environmental education. Some countries which have policies may still suffer from a lack of commitment in financial as well as technical support. This means that there are few opportunities and resources for developing teacher education for environmental education at the national level.

The above factors have resulted in gaps in the resources available for teacher education for environmental education, for example:

- There is a dearth of qualified teacher trainers for environmental education. This means that there is no multiplier effect when developing environmental education initiatives;
- There is a lack of model programmes for teacher education which could be used as a basis for curriculum development in that area;
- There are inadequate and insufficient resource materials in environmental education which could be used for the training of teachers. In some countries where some materials exist, these need to be translated into local languages;

- There are insufficient financial resources to initiate or sustain programmes in environmental education for teacher education, particularly from international and intergovernmental agencies.

The problems for teacher education in environmental education are intensified by the general lack of awareness and support from administrators and colleagues in teacher education institutions. In some countries the innovative teaching methods of environmental education conflict with the traditional culture of schooling. The problem is acute in countries where there is an emphasis on the content rather than the process of education. This makes the introduction of both in-service and pre-service education difficult.

When in-service courses are run these tend to be attended by teachers who are already committed to environmental education. There is a need to attract teachers who do not normally attend such courses.

Developments Outside Teacher Education

Despite the needs identified in the previous section, many Country Reports indicated that there was increasing support for the development of environmental education in teacher education by:

- Government policy;
- Non-government organisations;
- Media; and
- Collaboration and networking.

Government Policy

Environment ministries in many countries in the Asia-Pacific Region have developed impact assessment and licensing requirements that reflect increased environmental awareness monitoring and regulation. In Malaysia, for example all industrial projects must submit environmentally sound plans prior to the commencement of projects. Similarly, the enforcement of environmental policy is increasing throughout the region, for example, Thailand's Polluter Pays Policy (PPP).

Recent national environmental policies have recognised the significance of environmental education and have supported the development of national curriculum documents in environmental education. In New Zealand the national environmental policy on the environment was followed by a draft document providing guidelines for environmental education. This was followed by a Ministry of Education draft publication on environmental education for schools. In the Republic of Korea, China, Japan and Indonesia, for example, environmental education curriculum guidelines have also been established for schools.

Departments of environment, agriculture, fisheries, forestry, industry and electricity in various countries have developed materials that support environmental education curriculum in schools and teachers' colleges. In Australia, for example, the Department of Natural Resource Management has proposed curriculum packages and professional development focused on Landcare Education to address land degradation issues.

Non-Government Organisations (NGOs)

The Country Reports revealed that a number of non-governmental organisations are involved in assisting and supporting teacher education in environmental education. These include, for example: WWF, IUCN, youth groups, environmental clubs, professional associations, and business and women's groups.

These have happened in a number of ways:

Technical, resources and consultancy: NGOs have organised a range of projects related to environmental education. In the Philippines, for example, Miriam P.E.A.C.E .(a group of environmental educators) has conducted in-service training for teachers. They have also produced a curriculum framework and modules to assist teachers in environmental education. Similarly, in India NCERT and CEE have developed a curriculum for training teachers in both pre-service and in-service programmes.

Personnel: NGOs in many countries across the region have offered the services of their trained staff as guest speakers and resource people at the request of educational institutions.

Financial: NGOs have provided financial assistance for environmental education projects. An example is the rural community environmental education programme under the Centre for Research of Human Resources and Environment, University of Indonesia.

Policy Making/Decision Making on Major Projects: Some governments, such as Malaysia, the Philippines, Republic of Korea, Thailand, New Zealand, Australia, and Hong Kong consult members of NGOs when developing environmental education curriculum and policy. Hong Kong, for example, has a forum every two months of NGO and Government Departments to discuss teacher education.

Resource Centres: Resource centres have been developed in a number of countries. These resource centres offer in-service teacher education and support for the development of environmental education curriculum materials. India, for example, has developed the Centre for Environmental Education (CEE) where approximately 40,000 teachers have participated in training courses since 1993. Similarly in Thailand the Centre for Environmental and Global Education was established in 1992. In China WWF has co-operated with the State Education Committee to build teacher education centres for environmental education at three major Normal Universities.

Media

The media has also served to raise the profile of environmental education amongst teachers in many countries. In Pakistan, for example, a TV series has been developed to increase environmental awareness. Similarly, in the Republic of Korea, the Educational Broadcasting System (EBS) has been running a TV and radio series relating teacher education in environmental education as a regular programme nation-wide. In the Philippines and Vietnam radio programmes have kept environmental education on the educational agenda. Computer packages developed in India have supported teachers through their focus on local data and lesson outlines.

Collaboration and Networking

The Country Reports indicated that effective collaboration and networking between teacher education institutions and other environmental groups have been extremely successful. In Malaysia, for example, organisations such as the fisheries department, forest research institutes, WWF Malaysia and Malaysia Nature Society are involved in conducting specialist training in environmental education for teachers and students. Similarly in the Republic of Korea "Green Scout," which is an environmental NGO, has conducted teacher training workshops and field trips in environmental education for teachers. Japan, through the Society of Environmental Education, has provided a network for the dissemination and exchange of information and resource materials among the teachers.

Networking between the Citizen's Commission for Human Development, Pakistan, an NGO, and an educational TV channel has resulted in the production of a series of thirteen episodes on environmental issues, which have raised teacher awareness in environmental education. A similar programme has been undertaken in Thailand.

In Australia and New Zealand partnerships between NGOs, city and regional councils, colleges of education, universities, schools and national associations for environmental education have served to promote environmental education in teacher education.

Chapter 3: Learning for a Sustainable Environment: Innovations in Teacher Education Project

Background

Change and development in the twentieth century have brought many social and economic benefits to the people and nations of the Asian region. However, these changes have also caused a range of environmental problems. Overcoming these problems depends upon collaboration between researchers and governments in the region to find scientific, technological, legislative and economic solutions. Many of these solutions depend upon education.

Indeed, the international community is in wide agreement that education has an enormously important role to play in educating and motivating citizens to participate in environmental improvement and protection. Over two decades ago, Schumacher described education as "the greatest resource" in this endeavour. In the last decade, major international reports have stressed this also. The message of the Brundtland Report of the World Commission on Environment and Development (1987) and *Agenda 21* (the Report of the United Nations Conference on Environment and Development in Rio de Janeiro) (1992) is that it is possible to have development without jeopardising the ecosystem or resources base for the future. Each report speaks of the imperative of education to engender this ethic (Fien and Tilbury 1996).

In the Asia-Pacific region also, education has been identified as a critical factor and countries have adopted a range of strategies for implementing programs in environmental education. Many workshops and training programs have been organised to develop environmental education from primary through post-graduate levels. Significant work is taking place in redefining environmental education, particularly to incorporate concepts of sustainable development. Much exploration of how teacher education can meet the great need for environmental education is on-going in the region.

Development of the Project

Four regional and sub-regional meetings were held leading up to the *Learning for a Sustainable Environment* project:

- UNESCO Asia-Pacific Experts' Meeting on *Overcoming the Barriers to the Successful Implementation of Environmental Education through Teacher Education* held at Griffith University, Brisbane, 4-9 July 1993. The meeting developed guidelines and recommendations for achieving the goal, embodied in the title of the meeting.
- NIER-APEID Seminar on *Environmental Education and Teacher Education in Asia and the Pacific* held in Tokyo, 20 October to 5 November 1993. This meeting's first recommendation was for an action plan to develop prototype teacher education materials for trialing and revision followed by region-wide implementation.

- South East Asia Ministers of Education Organisation (SEAMEO) and UNESCO sub-regional conference on environment education and secondary teacher education held in Penang, 6-9 December 1993. This conference endorsed the recommendation from the NIER-APEID Seminar.
- APEID Project Planning Meeting held at Griffith University, Brisbane, 26 June to 1 July 1994 which developed the objectives, principles and strategies for the *Learning for a Sustainable Environment - Innovations in Teacher Education Project.*

Based on country reports submitted to these four seminars, a series of guiding principles aimed at enhancing the quality and relevance of environmental education was consolidated at the latter meeting. These principles represent a summary of best practice in contemporary environmental education in the region:

- Environmental education considers the environment in its totality, i.e. ecological, political, natural, technological, sociological, aesthetic and built environments.
- Environmental education develops awareness of the importance, beauty and wonder that is, and can be, found in these aspects of the environment.
- Environmental education explores not only the physical qualities of the human relationship with the environment, but also the spiritual aspect of this relationship.
- Environmental education is a response to the challenge of moving towards an ecologically and socially sustainable world.
- Environmental education is concerned with the interaction between the quality of the biophysical environment and the socio-economic environment.
- Environmental education transcends the division of knowledge, skills and attitudes by seeking commitment to action in an informed manner to realistic sustainability.
- Environmental education recognises the value of local knowledge, practices and perceptions in enhancing sustainability.
- Environmental education supports relevant education by focusing learning on local environments.
- Environmental education considers the global as well as the local environment. Since the world is a set of inter-related systems, there is a need for a world perspective on environmental issues.
- Environmental education focuses on current and future perspectives on environmental conditions.
- Environmental education is interdisciplinary and can be taught through and used to enhance all subjects in the curriculum.
- Environmental education emphasises participation in preventing and solving environmental problems and should foster and arouse a sense of personal responsibility, greater motivation and commitment towards the resolution of the environmental situation.

- Action is both a vehicle for and an outcome of environmental education.
- Environmental education develops the skills:
    - To identify alternative solutions for the environmental situation;
    - To clarify the values associated with the alternatives; and
    - To use these values to make decisions about which alternatives to choose.

Developing educational programmes based upon these principles can pose problems for many teachers, especially those who work in formal, centrally organised education systems. As Professor Peter Fensham stated in the Final Report of the Project Planning Meeting:

> The curriculum goals of environmental education overlap with, but also differ quite markedly from, those for other more familiar components in the school curriculum... Environmental education in its fullness involves very major changes in the ways teachers conceive of, and act in their classrooms. There are many ways teachers can contribute to education for the environment that involve smaller, but significant changes of thought and action. Conceptual and real behavioural changes, however large or small, are not easy and teachers are no different from others in not finding significant change easy.
>
> Invitations to change, or to try innovatory teaching strategies are almost inevitably seen as "additions" and hence requiring extra time and effort. The suggestion to innovate often comes as part of an external innovator's timetable and not at the point in the teachers' lives when they are dissatisfied with their present practice, and hence are looking for alternatives to solve a problem they personally recognise. The uncertain outcomes of using alternative pedagogies also are more likely to be seen as threatening the teacher's authority and the stability of their classrooms, than as improving these relationships, as they may in fact do (UNESCO-ACEID, 1994).

The Professional Development Process

The environmental education of teachers must address problems such as these and, to the greatest extent possible, be consistent with the principles of environmental education. The problem encountered by those who were developing the *Learning for a Sustainable Environment* project was to find a way of supporting this in a culturally diverse region that includes both the most populous country in the world (China) and some of the smallest (Pacific island states) as well as some of the wealthiest and some of the poorest. A standard set of prototype materials could not be culturally or educationally relevant, nor could they be the teacher educator's own. A solution to this problem was found in Hart's (1990) and Robottom's (1987, 1989) conceptions of professional development for environmental education. These have been applied in the professional development of teacher educators in this project.

Hart (1990) advocates reflection-in-action (Schon 1983) "as a concept for reconstructing teacher education .... founded in elements of critical theory and reflective teaching but ultimately grounded in a world view of pragmatic reconstructionism" (p.14). He argues that the constructivist epistemology of reflection-in-action, and its focus on the inter-dependence of teaching practices and contexts and also between teachers and their communities, are philosophically consistent with an ecological world view and, therefore, with environmental education. Hart has identified a range of parallels between ecology and educating teachers environmentally, as reflective practitioners:

> A reflection-in-action perspective on teacher education places emphasis on educational aims and consequences as well as the technical skills of teaching. Teachers (and teacher educators) are encouraged to consider ethical and value-based issues and this facilitates environmental education goals. Teachers (and teacher educators) are also encouraged to contribute to the formulation of policy at classroom, local, and national levels, thus acknowledging the political nature of human interpretations of the ecological process of change ....
>
> Teacher education programs based on a reflection-in-action paradigm emphasise a process model of education where teachers (and teacher educators) .... monitor and evaluate their own practice reflexively, that is, an action research model, a cyclical process in which teacher action-reflection-improved action is seen as a dialectic between theory and practice, much like the principle of reciprocal relationships is viewed in ecology. (Hart 1990, pp. 14-15).

This approach to professional development for environmental education has guided the development of this project. Also of great value has been Robottom's analysis of an environmental education perspective for professional development. Robottom (1987) argues that an environmental education perspective poses a dual pedagogical challenge for teacher education. The first resides in the objectives of environmental education which seek a transformation from "business as usual" approaches to development, to ecologically sustainable ones. As a result, environmental education requires pedagogical approaches which are markedly different from traditional teaching styles. These include interdisciplinarity, problematising knowledge and values, the active investigation of local issues, and the development of a willingness and skills to participate in environmental protection and improvement. These approaches need to be modelled in teacher education programmes.

The second challenge involves the development of professional development experiences and processes that can alert teachers to the transformative nature of environmental education and help them to become active, critically-reflective practitioners in their chosen profession. This perspective on teacher education has led to a sustained critique of centrally-driven, technicist "Research, Development, Diffusion, Adoption" (RDDA) models of educational change in the Asia-Pacific and other parts of the world. As Robottom (1989) has argued, such approaches tend to reduce the role of teachers (and, in our case, teacher educators) to that of "passive receivers" of centrally produced curriculum materials or “technicians” merely applying the ideas of external experts (p.441). Robottom concludes that two key characteristics of environmental education are undermined in the RDDA approach: the development of skills for critical thinking, self-evaluation and reflection, and the need for knowledge, values and actions of participants to be engaged in the process of change. Just as we would not want to neglect these objectives and principles in our teaching, we should not neglect them in our professional development work. The *Learning for a Sustainable Environment - Innovations in Teacher Education Project* has sought to maintain the ecological relationship between curriculum development, professional development, and practitioner-based research to the extent that available resources have allowed.

Guiding Principles of the Project

The project began in the first half of 1994 with the primary goal of assisting teacher educators in the Asia-Pacific region to include the educational purposes and innovative teaching and learning strategies of environmental education in their programmes. Following the model of professional development advocated by Hart and Robottom, the project has developed an action research network of teacher educators in the region. The purpose of the network is to support teacher educators who wish to share in the writing of carefully-researched and evaluated, and culturally-sensitive, workshop modules for use in pre- and in-service environmental education programmes. The network supports a dissemination programme which assists teacher educators to critique and adapt the modules in accordance with local cultural and educational needs and to prepare action research case studies of their use of the materials in their own continuing professional development. Thus, the project has created a growing, active network of innovative teacher education practices and practitioners in environmental education. The purpose of this professional development process for teacher educators is to assist them to incorporate into their programmes knowledge and skills which can help teachers to introduce and improve environmental education in their classroom. It is also hoped that promotion of the innovative teaching strategies of environmental education may also improve the quality of learning in other areas of the curriculum.

The project developed in three stages with teacher educators in a small number of countries joining the project at each stage. Stage 1 countries included: Fiji, Philippines, Hong Kong, New Zealand and Australia. Japan, India, Malaysia, Thailand, Vietnam, Pakistan and Indonesia joined the project in Stage 2. Stage 3 will commence in 1997, with the full list of countries participating yet to be finalised.

The guiding principles for the project were established at the 1994 Project Planning Meeting attended by several teacher educators who had also attended one of the 1993 Brisbane or Tokyo meetings. These participants developed two sets of principles to guide the project. The first set of project principles relates to characteristics of environmental education and the implications they have for the project. The second set relates to the rationale and objectives of the project in the light of issues related to the ecological relationship between curriculum development, professional development and research.

Project Principles Related to Environmental Education

- Environmental education involves participatory processes which should be reflected in the nature of the project and the pedagogies to be promoted in teacher education.
- Environmental education is interdisciplinary and focuses on the interaction between environmental quality and development issues. Hence, in teacher education, the relevant biophysical, economic and other social, cultural and political aspects of environmental issues should be recognised and investigated.
- Environmental education is responsive to local context. This means that local environmental questions, issues and problems should provide a focus for the development of environmental education projects. Therefore, materials produced in one country will need to be adapted by others in response to local cultural and educational requirements.
- Environmental education involves a range of innovatory teaching and learning strategies which can inform the development and improvement of teacher education.
- There are opportunities for environmental education to be taught through, and enhance all, subjects in the curriculum. Thus, environmental education is relevant to all aspects of the teacher education curriculum, including foundation studies, content studies and applied curriculum studies.

Project Principles Related to Professional Development

- The project's emphasis should be on personal and professional development of teacher educators rather than on the production of resources.
- Collegial and collaborative approaches underlie successful professional development. Hence, a system of critical friends should be established to review and trial early drafts of all prototype materials and to advise on their development.
- Active participation and critical reflection are essential components of professional development. Participation in the workshops organised as part of the project will provide such opportunities and assist teacher educators to:
    - Clarify the strengths and limitations of their present practice; and
    - Establish their personal ownership of the project through the critique, revision, and adaptation of curriculum resources.
- The cultural and educational diversity in the region requires a framework for professional and curriculum/resource development which gives direction to participants, but is flexible enough to accommodate local concerns and priorities.
- Existing networks in the region must be used and strengthened to facilitate the diffusion and dissemination of the innovative approaches developed by participants.

- The prime focus of the evaluation of the project should be on the teacher educators and the quality of their learning in relation to their use of innovatory teaching and learning strategies.

Overview of Project Strategy and Activities

These principles of environmental education and professional development were incorporated into a three-stage strategy for the development of the project.

Stage 1 of the project (1994 - 95) focused on writing a set of draft workshop modules, and involved:

- Establishing a network of teacher educators from a small group of countries and inviting each member to write an environmental education training module for his/her own use in teacher education;
- Establishing a system of "critical friends" from other parts of the region to assist these authors so that the materials would be flexible enough to have the potential to be adapted to suit the cultural and educational contexts of teacher education in other countries in the region;
- Maintaining a project office to co-ordinate the activities of the authors and critical friends and to plan later stages of the project;
- Conducting a review and training workshop (in 1995) at which teacher educators from an expanded group of countries would be invited to join the network. At the workshop, new members of the network were introduced to the materials that have been prepared and to the action research process through which their analysis, adaptation, trial and evaluation of the materials could be documented and shared with teacher educators in other parts of the region.

Stage 2 of the project (1995 - 96) focused on the trial and revision of the draft modules, and involved :

- Providing assistance to members of the network so that they could work through a four-step process of analysing, adapting, trialing and evaluating the materials;
- Providing assistance to members of the network to document their activities and reflections in the form of action research case studies;
- Revising the modules on the basis of the trials for wider dissemination and implementation across the region; and
- Analysing the action research reports to help understand the issues involved in using teacher education materials in cross-cultural settings, and to evaluate the effectiveness of the linkages between curriculum development, professional development and action research in the project;

Stage 3 of the project will commence in 1997 and focus on the implementation and dissemination of the project processes and materials for professional development across the region.

Stage 1: Writing Draft Modules

Stage 1 of the project commenced after the 1994 Project Planning Meeting and involved participants from five countries – Philippines, Fiji, Australia, New Zealand, and Hong Kong. Several environmental educators and teacher educators from these countries wrote a set of nine environmental education workshop modules. These were then extensively analysed by a network of over 70 "critical friends" across the region and revised accordingly. It has to be emphasised that the modules were written primarily for use by the authors in their own countries. However, the advice of the network of critical friends gave the modules wider cultural relevance. The critical friends endorsed all of the modules as being suitable for adaptation and use in other countries of the region.

The guiding principles for the project outlined in the previous section were reflected in the guidelines for the development of modules provided to the module authors which included:

- All modules should be *written by authors for their own use* in a sufficiently flexible way that they can be shared with colleagues in their own country and other parts of the region.
- All modules should be written in a *workshop format*.
- All modules should be based on *participant centred experiential learning processes* and involve direct and active personal experience in order to identify, develop and reinforce new skills.
- Modules should be *flexible* in the following ways:
    - They should be open and flexible enough to allow for culturally responsive adaptation;
    - They should be self-standing, with cross-references to show themes;
    - There should be no restrictive sequence to modules;
    - They should allow for both pre and in-service contexts;
    - They should allow adaptation for primary, secondary and informal contexts; and
    - They should allow for different styles/phases of activities during the workshop, for example, some which are facilitator-driven, some which are co-operative and some which involve independent work.
- Modules should be organised according to those *innovative teaching strategies* through which environmental concepts, skills and values can best be developed.
- The modules should *not be seen as a finished product* but should reflect a dynamic resource that is constantly evolving as it is analysed, adapted, trialled and evaluated.

> This reflects a concern for professional development as opposed to product development, for the open-ended resource would allow for the possible addition of local and/or self-developed materials and adaptation.

The nine workshop modules provide information on many environmental themes in the region and illustrate a range of innovative strategies for planning curricula and teaching about them. The topics of the workshops are:

- Nature and Objectives of Environmental Education;
- Whole School Approaches to Curriculum Planning in Environmental Education;
- Values Education and Environmental Ethics;
- Using Indigenous Knowledge, Practices and Perspectives, and Story-Telling in EE;
- Teaching Ecological Concepts and Principles through the Analysis of Local Environments;
- Using the Environment as a Resource for Learning;
- Issue-or Enquiry-based Teaching for the Environment;
- Assessment of Learning in Environmental Education; and
- Action Research as a Teaching Strategy in Schools and Communities.

Each workshop is approximately five to six hours in duration and may be used at either the in-service or pre-service teacher education level.

A network of critical friends for each Stage 1 author was established from the attendance list of the three 1993 UNESCO meetings - nearly seventy teacher educators from over twenty countries provided advice and suggested revisions.

The Network for Environmental Training at the Tertiary Level in Asia and the Pacific (NETTLAP), located within the UNEP Regional Office for Asia and the Pacific in Bangkok, sponsored a feasibility study and survey to establish wider perceptions of the need for the project and develop a mailing list of persons in the region interested in participating in the project.

A Project Review Meeting in May-June 1995, in Thailand, brought together participants from Stages 1 and 2 of the project. The meeting enabled the growth of relationships between authors, critical friends, and new members of the project. In addition, new members of the network were introduced to the materials that have been prepared and to the action research process through which their analysis, adaptation, trial, and evaluation of the materials can be documented and shared with teacher educators in other parts of the region.

Detailed feedback at this meeting was provided to the Stage 1 authors on ways their modules could be further revised in preparation for the trials in Stage 2. In their evaluation of the modules, the participants believed that these nine modules generally provided an excellent framework for professional development activities in environmental education in the region, and were impressed by a number of features of the modules, including:

1. The range of module topics and their relevance to the professional development needs of environmental educators in the region.
2. The range of topics provided for basic introductory workshops, as well as advanced workshops, on particular teaching strategies.
3. Each module deals comprehensively with the major concepts and skills on the individual topics covered.
4. The modules are practical and activity based and provide for participant centred experiential learning processes.
5. The modules are flexible in that they allow for:
    - Culturally responsive adaptations in different countries;
    - Cross-referencing to show themes;
    - Both pre- and in-service use; and
    - Adaptation for primary, secondary and informal contexts.
6. The utility of the modules, not as a finished product, but as a dynamic resource that is constantly evolving as it is analysed, adapted, trialed and evaluated.

Stage 2: Trialing the Draft Modules

An action research process which could cater to the professional development goals of the project was used to trial and evaluate the draft modules in twelve countries across the region. The action research process in each trial involved four steps:

1. Review and Analysis

The *Working Principles for the Development of Modules* states that the modules were to be written "by authors for their own use". Each original author considered his or her own professional context when preparing a module. Trialists were encouraged to take similar considerations and to analyse the materials to identify their relevance - or otherwise - to local cultural, geographical and educational circumstances.

2. Adaptation

The results of such an analysis were used by trialists to help adapt the modules to meet the needs of their own students in their own countries. This included: deleting or changing certain activities and resources, incorporating their own resources and activities, translating overhead transparencies and readings, etc.

3. Trial and Evaluation

The adapted modules were trialed and evaluated in a range of settings - with (a) pre-service teacher education students, with (b) experienced teachers attending in-service workshops, and in (c) workshops attended by teacher educators as well as local government and NGO officers. Figure 1 summarises the trials that were conducted in Stage 2 of the project.

Figure 1: The contexts of the module trials in Stage 2

Module Title	(a) Pre-Service	(b) In-Service	(c) Teacher Educators
Nature & Objectives of EE	Japan New Zealand Thailand Hong Kong* + Malaysia*	Australia New Zealand Thailand Philippines Vietnam Republic of Korea*	India New Zealand Thailand China* Indonesia* Malaysia* Vietnam*
Whole School Approach to EE	Vietnam Malaysia* Thailand*	Australia Vietnam Republic of Korea*	Vietnam Malaysia* Indonesia* Thailand*
Using the Environment as a Resource for Learning	Indonesia New Zealand Vietnam Malaysia*	Indonesia New Zealand Philippines Vietnam	New Zealand China* Malaysia* Thailand*
Environmental Values and Ethics	Australia Indonesia Japan Hong Kong*	Indonesia Vietnam*	Indonesia* Thailand* Vietnam*
Issue or Inquiry Based Teaching	New Zealand Thailand*	Australia New Zealand	New Zealand Malaysia* Thailand*
Ecological Concepts	Vietnam	Thailand Vietnam	Thailand Indonesia*
Indigenous Knowledge	Australia Fiji Indonesia*		
Action Research	Thailand Vietnam	Thailand Vietnam	Indonesia Vietnam Thailand*
Assessment	Australia Hong Kong*		

* Plans have been made to trial these modules in the near future

+ Initial teacher education but not pre-service teacher education

4. Reflection and Reporting

When trialists had completed the trial and evaluation of their modules, they wrote a report in which they reflected on both the quality of the learning experience provided for participants and on the value of the trial/action research process for their own professional development.

The Project Office prepared draft guides for all persons and institutions participating in the project in Stage 2, to enable them to write action research-based case studies of the factors that influenced their critique, revision, adaptation and re-writing of the Stage 1 modules. The purpose of the Review Guide was to provide the trialists with structured professional development experiences during the analysis, adaptation, trialing and reporting phases of their work.

The Review Guide was written to assist participants in the trial process to answer three key questions:

1. What has this workshop done for my personal professional development?
2. How and for what reasons are adaptations needed for the modules?
3. Was the adaptation and trial an effective experience for professional development?

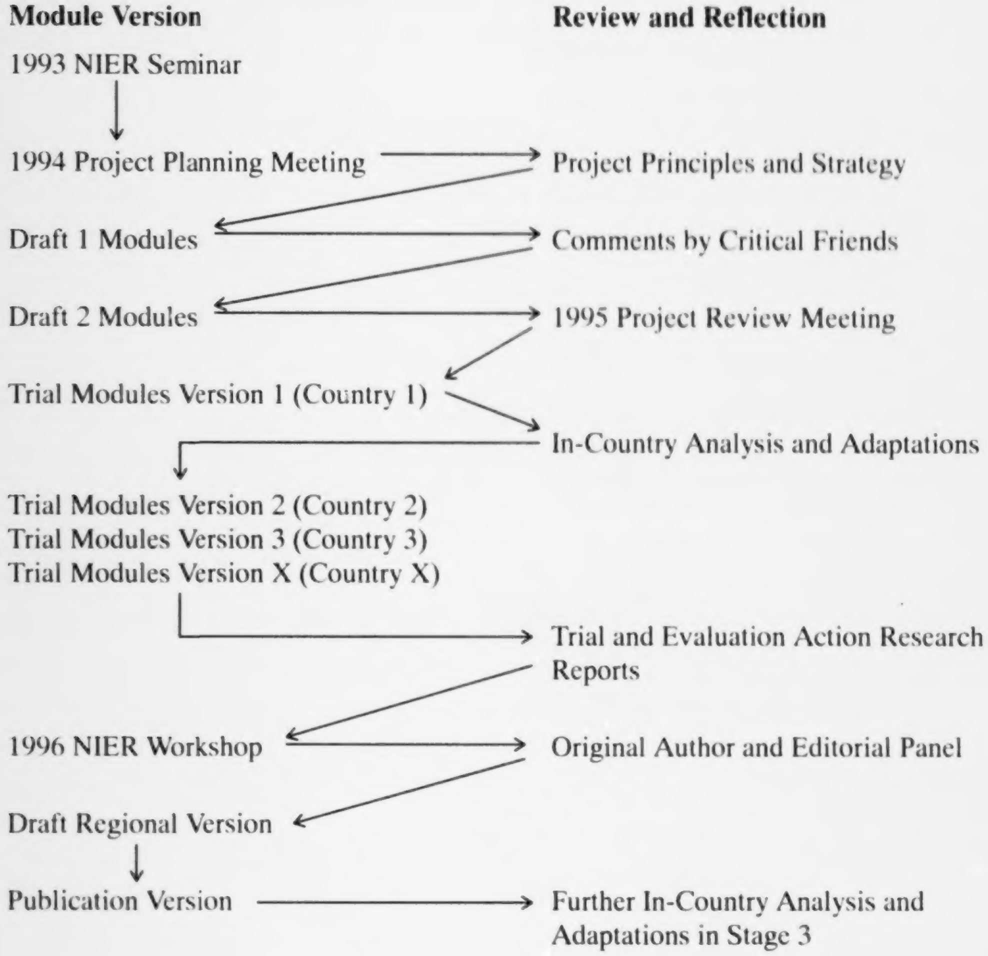
A copy of a sample Review Guide completed in The Philippines is provided in Appendix 2.

The completed Review Guides provided research data both for the Stage 1 authors to assist them in the further revisions of their modules, and also for the trialists in writing an action research case study report of their experience with the project. A copy of a sample action research case study prepared in Fiji is provided in Appendix 3. The purpose of providing the two reports in Appendix 2 and 3 is to illustrate the four-step action research approach to professional development for teacher educators used in Stage 2 of the project.

The Review Guide was additionally significant in that it ensured a consistent macro-structure for the trial and reflection process across the region, whilst being sufficiently flexible to meet the individual needs of workshop facilitators working within the broad cross-section of cultures and educational systems of the Asia-Pacific. The wide consultations on the nature and structure of the Review Guide and the contributions of various educators involved with the project helped ensure that the document could be used with credibility within the cross-cultural framework of the project.

The trialing process not only resulted in a range of professional development experiences for all of those involved (see Chapter 4), but also resulted in the progressive improvement of the quality and regional relevance of the modules. A summary of the review, adaptation, evaluation and revision processes is provided in Figure 2.

Figure 2: The process of progressive improvement of versions of the modules through review and reflection


Module Version
Review and Reflection
1993 NIER Seminar
1994 Project Planning Meeting
Project Principles and Strategy
Draft 1 Modules
Comments by Critical Friends
Draft 2 Modules
1995 Project Review Meeting
Trial Modules Version 1 (Country 1)
In-Country Analysis and Adaptations
Trial Modules Version 2 (Country 2)
Trial Modules Version 3 (Country 3)
Trial Modules Version X (Country X)
Trial and Evaluation Action Research Reports
1996 NIER Workshop
Original Author and Editorial Panel
Draft Regional Version
Publication Version
Further In-Country Analysis and Adaptations in Stage 3

Stage 3: Dissemination and Implementation

The goal of Stage 3 will be the broader dissemination and implementation of the project. Stage 3 will invite participation from teacher educators in all countries and national and international institutions so far involved in the project, as well as several new countries. It is envisaged that participants from Stage 2 countries may take on the role of authors and write and share new modules with others, thus maintaining the focus of creating a spiralling network of innovative teacher education practices and practitioners in environmental education in the Asia-Pacific region.

Conclusion

The seminar, which is the focus of this report, was planned to enable project network members to present the results of the Stage 2 trials of the modules and their recommendations for revisions. The seminar also provided an opportunity to conduct a meta-analysis of these case study reports and to prepare a generic regional manual and further guidelines for professional development in local and national settings in Stage 3. This seminar also expanded the circle of network participants, with China and the Republic of Korea joining.

The working sessions of the seminar were organised to achieve these goals.

Chapter 4: Evaluation of the Action Research Network Process for Professional Development

Introduction

The primary goal of the project is to assist teacher educators in the Asia-Pacific region to include the educational purposes and innovative teaching and learning strategies of environmental education in their programmes. The project has sought to achieve this goal by providing professional development opportunities for teacher educators. The purpose of professional development for teacher educators in this project is to assist them to incorporate into their programmes the knowledge and skills which can help teachers to introduce and improve environmental education in their classroom. It is also hoped that the promotion of the innovative teaching strategies of environmental education may also improve the quality of learning in many other areas of the curriculum.

The strategy for professional development adopted in this project was to form an action research network of teacher educators in many countries in the region who shared in the development, analysis, adaptation, trialing and evaluation of carefully researched and culturally sensitive workshop modules for use in both pre-service and in-service teacher education programs. Members of the network shared their modules, and adapted them in accordance with local needs. After evaluating their analysis, adaptation and use of the modules, each member of the network wrote an action research case study of the contribution of the process to their continuing professional development. This process was described in Chapter 3.

The process was evaluated at the seminar through group and plenary discussion and through a meta-analysis of the action research case studies that network members wrote on their experiences during the trials. These discussions and the meta-analysis were organised to seek answers to five questions:

1. **Personal professional development:** What did you learn - what benefits did you gain - from participating in the network - either as an author, critical friend or trialist?
2. **Positive influences on the process:** What factors contributed to the success of your professional development experiences and benefits from the project?
3. **Issues related to the process:** What problems, obstacles, or barriers (however small or large) did you face as an author, critical friend or trialist? How did you overcome these?
4. **Recommendations for improving the process:** If we were starting the project again, what changes (however small or large) would you recommend in order to help improve the operations of the network and trial process?

5. **Wider application of the process:** To what extent (and in what ways) could the action research network process used in this project be used to promote the professional development of teacher educators in other curriculum areas in the Asia-Pacific region - or even in other UNESCO regions?

Personal Professional Development

All participants indicated that they gained a great deal from the action research process of reviewing, adapting, trialing and evaluating the project modules. Many indicated they were transformed from being an *environmentalist* into and *environmental educator* through this process. They stated that during the project they developed a rich knowledge and understanding of the scope and purposes of environmental education, as well as the ability to choose and make use of the most appropriate teaching and learning strategies to develop the environmental education competencies of student teachers and teachers attending in-service education workshops.

The professional development process was supported by the collaborative processes adopted in this project. The action research network and project office supported collaboration between countries, facilitating the sharing of ideas for developing teacher education in environmental education. By attending seminars, participants were able to make plans for writing and trialing modules in their countries with the advice and support of experienced colleagues from other countries. Guidelines provided by the project office for evaluating and reporting on the progress of these plans at subsequent workshops were seen as key influences on the high level of professional development experienced by participants.

For a number of countries, participants reported that involvement in the project provided a catalyst for the promotion of environmental education. One of the professional development benefits from involvement in the project reported by participants was an increased sense of confidence and personal efficacy to deliver environmental education in teacher education at both pre-service and in-service levels and to encourage teacher education colleagues, supervisors and others to actively promote environmental education also.

Authors of modules said that they especially benefited from the positive feedback and the ideas for improvement and extending the cultural relevance of their module provided by critical friends and trialists. Trialists said that they especially benefited from having a lot of the original time consuming research and innovative teaching strategies done for them by the authors, and from the model workshop ideas provided in the draft modules. They then found that it was generally easy, on most occasions, to substitute local examples and to revise the structure of the workshop to suit local time constraints and educational contexts.

Many participants commented that writing an action research report on their participation in the trials greatly aided their development as educational researchers. The assistance with data gathering and structure of the case study report provided by the project office and the review guide were seen as invaluable, especially for those who were relatively new to the research process. Researching one's own practice was seen as a very relevant and accessible approach to research for teacher educators. In this way the project might be seen as an important contribution to helping develop a culture of research among teacher educators in the Asia Pacific region.

Positive Influences on the Process

In analysing the reasons for the success of the professional development afforded by participation in the action research network, participants identified a variety of levels of influence, including personal, institutional and regional influences. At the personal level, participants indicated that they enjoyed responding to the challenges of implementing and evaluating innovations in their teacher education work and of participating in a cross-national collaborative project. They derived great motivation from their challenges and from the intrinsic satisfaction that came from the successful adoption of the innovative teaching approaches by participants in their in-service and pre-service workshops.

Participants also commented on the positive support they had received from their colleagues and institutions. This came variously in the form of encouragement, assistance with secretarial support, photocopying, etc., and, in many cases, from the direct relevance to existing college courses and subject content. Other participants were able to incorporate the module trials into the in-service education outreach activities of their institutions or professional associations. These factors meant that the module trials often could be seen as part of the normal scope of duties of participants. However, the commitment of many participants meant that they devoted a considerable amount of their own time (and sometimes funds) in revising, translating, adopting, delivering workshops, and evaluation of the trials.

The largest number of positive influences for professional development were at the regional and international level. The project has great credibility because it was supported by UNESCO-ACEID. This encouraged their colleagues and institutions to support them. A second regional influence was the support from other members of the network. Participants indicated that learning from the experiences of others was very important.

Participants were unanimous about the role of the project in providing encouragement and its excellent co-ordinating function in preparing guidelines for all persons and institutions in Stages 1 and 2. This included advice to Stage 1 authors and critical friends related to writing and critique of modules. Advice to Stage 2 participants enabled them to write action research-based case studies of the factors that influenced their critique, revision, adaptation and re-writing of the Stage 1 modules. The case studies also addressed the issues involved in using cross-cultural materials in teacher education.

Issues Related to the Process

Participants identified four outstanding issues in, or barriers to, their work on the project as an author, trialist or critical friend. These included time, funding and the expertise of students and teacher educators, as well as the process of adapting the modules.

The problem most often identified by the participants was "time". Many participants indicated that they often used their own time to write, trial and participate as critical friends for this project. Finding time and space within the teacher education curriculum also posed a problem for some trialists at the pre-service level. The relatively long length of some modules also posed problems for some. This problem was overcome by adapting modules - by leaving out less locally significant sections and optional activities and thus reducing the amount of content covered.

Funding was another issue encountered by some participants. This included funding for the preparation and delivery of workshops, as well as translating the modules (or parts of them) into local languages. Both of these issues were overcome by securing small amounts of funding, from UNESCO or local sources, or using personal funds.

The negative attitude of some teacher education colleagues was an issue faced by some participants where colleagues were not familiar with the nature and scope of environmental education or the most appropriate balance to adapt regarding learner centred versus teacher centred teaching and learning strategies. This could be overcome, it was suggested, through the provision of national workshops, as well as the wider availability of the project modules.

The final issue involved availability of strategies and resources for adapting the modules. A number of factors need to be considered when adapting modules, including the level of difficulty and local relevance of concepts and skills involved, the teacher trainees' familiarity with some of the teaching and learning strategies, the availability of materials to localise the modules, and issues related to translation. It was suggested that further details or a glossary should be provided for workshop facilitators to assist with some of the more difficult concepts.

Participants suggested that the modules were not only applicable to teacher education, but they also could be adapted for use by government officials and administrators. It was thought that this process would facilitate the inclusion of environmental education in teacher education by developing a positive attitude to environmental education amongst education decision makers.

To highlight the adaptability of the module, participants suggested that the next stage of the project could include details of the types of adaptations made by various countries. This could also illustrate the multiple pathways offered by each of the modules.

Recommendations for Improving the Process

A number of suggestions for improving the project were offered by participants. Many of these are of direct relevance to Stage 3 of the project.

The development of additional modules, such as a new module focused on preparing materials for primary level environmental education, was a key suggestion. Other suggested improvements included: placing the modules on Internet for wider access, providing email for all network members; and promoting the development of national environmental education associations and an international environmental education association.

Participants also indicated that the next step for the project should involve more opportunities to disseminate the project within the region and individual countries. Inclusion of more Pacific countries was mentioned specifically. An increased budget for the project would allow more infrastructure for this dissemination process. Requirements include: printing of the modules, inservice training for people presenting the modules, the inclusion of teacher educators from various disciplines to consider environmental education across the curriculum, and funding for translation and regular meetings of network members at the national and regional level. Throughout the dissemination process it will be important to include government officials and administrators, to ensure their understanding of the importance of environmental education in teacher education.

Wider Application of the Process

The participants strongly endorsed the action research network approach to professional development adopted in this project as directly relevant to the professional development of teacher educators in other curriculum areas and in other geographical regions. The action research cycles of analysis, planning, evaluation and reflection used by the authors, critical friends and trialists in this project was recognised as the most rewarding approach to both curriculum and professional development that most participants had experienced. They particularly valued the following aspects of the regional network approach to the improvement of their work as teacher educators:

- Participants appreciated the opportunity to learn from the educational experiences of other countries, especially when most were able to meet every one to two years to share updated news on initiatives and liaise on possible solutions to ongoing concerns.
- Participants acknowledged the motivational value of agreeing to work collaboratively and having to plan their work to meet internationally agreed timelines.
- Participants welcomed the ongoing support and guidance of the established project office.
- Participants believed their professional expertise was respected in the project and that they were able to play an active role as equals with colleagues from other countries.
- Participants welcomed the democratic consensus approach to decision making in the operation of the network and the openness of their regional colleagues to the opportunities and constraints posed by local, cultural and educational influences.
- Participants believed that the module review and adaptation process allowed them to acknowledge the commonalties in their work, experiences and plans, while maintaining and respecting the value of local adaptations to the content and approach in the modules.
- Participants believed that the action research network approach was a relatively inexpensive way of providing a catalyst for curriculum and professional development

> in teacher education. They also appreciated the way in which involvement in the project served as a catalyst for many additional local initiatives in national curriculum policy and guidelines for environmental education, community development and non-formal education.

As a result of all these factors, participants believed that the action research network approach could be used not only for professional development in teacher education in environmental education, but also in many other curriculum areas, especially in cross-disciplinary fields such as civic education. Participants also suggested that the network approach would be useful for professional development in both formal and non-formal education, for educators at all levels from kindergarten to university, and also for officers in government departments and non-government organisations. Participants also believed that the action research network approach could be applied at scales other than the regional scale used in this project. For example, they argued that it would be very relevant for use at the national, provincial and local district scale, to create support systems for professional development

Chapter 5: Evaluation and Revision of the Project Modules

Introduction

Participants used the case study reports of their experiences and reflections in trialing the project modules for two purposes: (i) to evaluate the modules as a set of professional development materials, and (ii) to provide guidelines for the revision of the modules into a regionally appropriate professional development manual. The discussions on these issues at the seminar were part of the ongoing review and improvement process for the modules outlined in Figure 2 in Chapter 3.

The purpose of revising the modules in this way is to produce a training manual which contains a set of generic modules based upon the principles and examples that emerged in the action research trial and evaluation process. The generic modules would then be available to teacher educators in the region to analyse, adapt and evaluate to suit the requirements of their local cultural and educational contexts. In this way, it is intended that the reflective action research approach to professional development used at the regional level in Stage 2 be extended to national and local levels in Stage 3.

Evaluation of the Modules

In order to develop guidelines for the revision of modules, participants analysed the overall quality and usefulness of the modules and ways in which they may be improved. This involved revising the evaluation of the set of draft modules presented at the 1995 Project Review Meeting. Participants at the 1995 meeting believed that the nine draft modules generally provided an excellent framework for professional development activities in environmental education in the region and were impressed by several features of the modules. Participants at the 1996 seminar generally agreed with these features and, in several cases, clarified them in order to provide revision guidelines for authors and editors. Participants also provided two additional points of evaluation. Thus, participants agreed that:

1. The modules address a wide range of topics that are relevant to the professional development needs of environmental educators in the region. *However, participants suggested that there needed to be some additional material to clarify concepts, and that alternative or additional examples could be provided to guide adaptations to the modules. This would be particularly useful for teacher educators and others involved in non-formal education who might not be familiar with certain teaching strategies. It was suggested that alternative pathways and simplified versions for some modules be considered.*

2. The range of topics provide for basic introductory workshops, as well as advanced workshops on particular teaching strategies. *Participants suggested that three modules*

could be seen as introductory. These were: Nature and Objectives of Environmental Education, Whole School Approaches to Environmental Education, and Environmental Values Education and Ethics.

3. The scope of each module deals comprehensively with the major concepts and skills on the individual module topics. *Participants suggested that a glossary of key concepts be provided to assist in the interpretation of new ideas.*

4. The modules were practical and activity based and provided for participant centred experiential learning processes. *Participants also suggested that, wherever possible, additional practical activities be provided, as well as activities to assist with practical application.*

5. The modules are flexible in that they allow for:
   - Culturally responsive adaptations in different countries;
   - Cross-referencing to show themes;
   - Both pre- and in-service use; and
   - Adaptation for primary, secondary and non-formal contexts.

Participants also suggested that, wherever possible, the key aims, objectives and processes of environmental education be included in all modules in order to reinforce these ideas.

6. The modules are not seen as a finished product but reflect a dynamic resource that can be continuously revised as they are analysed, adapted, trialed and evaluated.

In further evaluating the modules as a set of professional development materials, participants identified two additional positive aspects of the modules. Firstly, they stated that the trial process had acted as a catalyst to many initiatives in teacher education for environmental education in their countries, and also led to new initiatives in non-formal education and community development. These included, for example:

- National teacher education workshops for teacher education in environmental education in New Zealand and Thailand (1996) and Indonesia, Fiji and Malaysia (planned for 1996-97);
- A planned national centre for excellence in teacher education for environmental education in Pakistan and Vietnam;
- The development of a set of professional development materials for the study of coastal and marine environments based upon the project modules for teachers in Australia; and
- Community leadership development and environmental improvement projects in Vietnam and Indonesia.

Secondly, participants indicated that several modules would be most valuable to use not only in environmental education courses, but also as part of general teacher education courses because they provide excellent models for developing teachers' skills in a range of innovative teaching and learning strategies.

Issues and Recommendations for the Revision of Modules

As outlined in Chapter 3, the project modules were written in Stage 1 in 1994 by the original authors for their use in their own countries. These first drafts of the modules were revised after comments by critical friends from many countries of the region, and after comments provided at the 1995 Project Review Meeting. One purpose of the Stage 2 trials in 1995 and 1996, was to provide advice to authors and editors for further revision. Substantial advice for the revision of each module was provided for individual authors. In addition, participants developed a set of general principles for module revision, as well as specific principles, on the format, language, style and content of modules.

General Principles

The modules should:

- Be seen primarily as support materials for professional development for teacher education, with the potential of being accessed by a wide audience, including ministries, other decision making, bodies and community groups;
- Include more explicit reference to the environmental education process within the modules;
- Develop commitment and skills and not just consciousness - raising;
- Consider a consistent view of "action";
- Include the environmental education process skills in order to prepare the facilitator and the participants who may not be familiar with the participatory approaches;
- Acknowledge that some issues in environmental education are debatable;
- Identify linkages with the objectives of environmental education from the "Nature and Objectives of Environmental Education" module; and
- Provide a mixture of student centred facilitator style approaches and teacher directed approaches in some cases to cater for cultural differences in different countries.

Principles Related to the Structure of Modules

The following principles were suggested for revisions to the structure of the modules:

- Use boxes within the modules to illustrate sample adaptations made in various countries, particularly to illustrate cultural adaptations, subject-specific adaptations, or adaptations related to national education policies and syllabi. Boxes may also be used to include examples of pre-service and in-service adaptations, as well as versions suitable for non-formal use by community groups.
- Provide notes to highlight how modules might be adapted, for example, to local issues, into a number of shorter sessions, suggesting the most capable people for delivering modules based on subject areas.

- Prioritise the objectives within modules.
- Include diagrams or a matrix to illustrate the linkages between modules.

Principles Related to the Style of Modules

The following principles were suggested for revisions to the style of the modules:

- Consider the idea of incorporating a more graphic and visual approach for different learning styles.
- Maintain the consistency of style across the modules.

Principles Related to the Language Used in Modules

The following principles were suggested for revisions to the language used across the modules:

- Include a glossary or additional materials for facilitators to understand difficult concepts.
- Ensure gender neutral language is used.

Principles Related to the Content of Modules

The following principles were suggested for revisions to the general content of modules:

- Maintain the balance between natural and socio-cultural environments as examples in the modules.
- Include a wider range of alternative themes and readings for the facilitator to choose from.
- Facilitators should be encouraged to structure the content of the modules into shorter time frames by dividing the sections into shorter discrete sessions.
- Increase the experiential dimension by using a variety of learning environments such as in-class and outdoors. Practical activities, application and participatory methods should be considered to develop critical thinking and process skills needed for problem solving.
- Ensure that the titles and objectives of modules are relevant to and accurately reflect the content of the modules.
- Use classroom anecdotes/scenarios as a vehicle for providing examples of theoretical content.
- Ensure that modules include classroom and curriculum applications of the concepts and skills explored in modules.

Chapter 6: Proposals for Stage 3

The teacher education sector is the particular focus of the activities of the *Learning for a Sustainable Environment: Innovations in Teacher Education Project*. Stages 1 and 2 were described in Chapter 3 while Chapters 4 and 5 presented the results of the evaluation of these two stages. The purpose of this chapter is to report on the plans for dissemination and implementation proposed at this seminar. These plans are expressed as:

1. Objectives;
2. Principles; and
3. Strategies for national and regional implementation.

Objectives

The overall goal of this project is to contribute to the identification of environmental education as a priority in formal and non-formal education. The objectives of Stage 3 are:

1. To have the *Learning for a Sustainable Environment: Innovations in Teacher Education Project* recognised by the ministries and departments of education of each country, with the support of UNESCO.

2. To develop and enrich national action programmes which support the professional development of teacher educators, teachers and leaders in environmental education in both formal and non-formal sectors.

3. To provide a regional programme of activities which support national efforts in professional development and teacher education for environmental education in the Asia-Pacific region.

Principles

1. The project's emphasis should be on using curriculum and resource development to enhance the personal and professional development of teacher educators.

2. Collegial and collaborative approaches underlie successful professional development. Hence, a system of critical friends could be established to review and trial early drafts of all prototype materials and to advise on their development.

3. Active participation and critical reflection are essential components of professional development. Participation in the analysis, adaptation, trial and evaluation of material will provide such opportunities and assist teacher educators to:

   - Clarify the strengths and limitations of their present practice;
   - Take responsibility for their own professional development; and

- Become committed to the promotion of environmental education.

4. The cultural and educational diversity in the region requires a framework for professional and curriculum/resource development which gives direction to participants but is flexible enough to accommodate local concerns and priorities.

5. Existing networks in each country and the region must be used and strengthened to facilitate the diffusion and dissemination of the innovative approaches developed by participants.

6. The prime focus of the evaluation of the project should be on the teacher educators and the quality of their learning in relation to their use of innovatory teaching and learning strategies. Ultimately, the success of environmental education in teacher education in a country can only be gauged by improvements in the commitment of the citizenry to environmental protection and real changes in the quality of the environment.

National Strategies

The purpose of a national strategy is to help promote environmental education in teacher education through national capacity building. The following are suggestions from which countries may select in developing locally appropriate strategies:

- Assigning a national co-ordinator(s) for the national professional development network;
- Operating a national/district project office;
- Establishing a national/district committee/group for environmental education in teacher education;
- National/district project newsletters;
- Translation and adaptation of modules;
- National and district train-the-trainer workshops to introduce the professional development network process and the modules to other teacher educators;
- Develop team teaching partnerships as a professional development approach with colleagues;
- Develop distance education and extension services for the professional development of teacher educators in remote areas;
- Representation to senior officials in teacher training colleges and ministries of education (particularly curriculum development departments, where appropriate) to obtain their support;
- Fund-raising;
- Help establish and/or work with existing professional societies/associations in both environmental education and teacher education;

- Media releases and award programmes to build support for environmental education and teacher education;
- Work with others to seek reforms in school examination systems to include environmental education outcomes; and
- Project evaluation.

Regional Strategies

The purpose of a regional strategy is to provide support to national strategies. Possibilities include:

- Maintaining the project office, resource centre, clearing house and newsletter;
- Conducting high level consultations/seminars with ministers of education and senior ministry officials;
- Fund-raising to support regional activities and national activities;
- Developing a national co-ordinators' training program;
- Conducting a national co-ordinators' training workshop;
- Editing and publishing a project manual of "generic" modules;
- Distribution of ACEID book on environmental education in teacher education across the region;
- Presentations about the project at national and international conferences and seminars to build support for the project;
- Develop a project home-page on World Wide Web;
- Publication of articles in national journals in national languages;
- Reports on project implementation in UNESCO publications, such as APEID newsletter and *Connect*;
- Support collaboration between environmental education teacher educators and researchers across the region to promote environmental education research; and
- Create 1-2 regional co-ordinator positions in order to (i) maintain the project office, (ii) be available to travel between countries to assist with local activities, (iii) support the development, trial and revision of new modules, (iv) evaluate the project, etc. Possible sources of funds include: UNESCO, UNEP, NIER, governments in the region, multilateral agencies and foundations.

Chapter 7: Recommendations

Based on the review, discussions and agreements in the seminar, the following recommendations were presented and were unanimously accepted by the participants.

1. That the project should continue into Stage 3 with the formation and expansion of national professional development projects for environmental education in teacher education supported by regional networking activities.
2. That NIER should continue to support and monitor the project through continued technical advice and convening a seminar in two years time to evaluate Stage 3.
3. That the action research network approach to professional development in teacher education trialed and evaluated in this project be considered by UNESCO and other international agencies as a proven process for cross-national collaboration in the dissemination of educational innovations. This could include other regions replicating this project in environmental education and/or applying the process to other educational innovations, e.g. teacher education for peace.

REFERENCES

Fien, J. and Tilbury, D. (1996) *Learning for a Sustainable Environment: A New Agenda for Teacher Education* (Bangkok: UNESCO-ACEID).

Hart, P. (1990) Rethinking teacher education environmentally, in *Monographs in Environmental Education and Environmental Studies*, Vol. VI (Troy, Ohio: North American Association for Environmental Education).

Robottom, I. (1987) The dual challenge for professional development in environmental education. In A. Greenall, ed., *Environmental Education: Past, present and future* (Canberra: AGPS).

Robottom, I. (1989) Social critique or social control: Some problems for evaluation in environmental education, *Journal of Research in Science Teaching*, 26(5), pp. 435-443.

Schon, D. (1983) *The Reflective Practitioner: How professionals think in action* (New York: Basic Books).

Schumacher, F. (1973) *Small is Beautiful: Economics as if people really mattere*d (London: Abacus Books).

UNCED (1992) Promoting education and public awareness and training, *Agenda 21*, United Nations Conference on Environment and Development, Conches, Chapter 36.

UNESCO (1993a) *The Final Report: UNESCO Asia-Pacific Regional Experts' Meeting on Overcoming the Barriers to Environmental Education through Teacher Education* (Brisbane: Griffith University).

UNESCO (1993b) *The Final Report of a Regional Seminar: Environmental Education and Teacher Education in Asia and the Pacific* (Tokyo: National Institute for Educational Research).

UNESCO-ACEID (1994) *Final Report of the Planning Group Meeting for the UNESCO-ACEID Project, Learning for a Sustainable Environment - Innovations in Teacher Education* (Brisbane: Griffith University).

World Commission on Environment and Development (1987) *Our Common Future* (Oxford: Oxford University Press).

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Appendix 1: Country Reports

AUSTRALIA

John Fien and Debbie Heck

SUSTAINABLE DEVELOPMENT: CHALLENGE AND RESPONSE

We reported to the 1993 APEID Seminar on Environmental Education and Teacher Education in Asia and the Pacific that Australia has a long history of environmental education going back over 40 000 years. The Aboriginal peoples of Australia established a human ecology which was in harmony with the natural ecology. The Aboriginal people had elaborate systems for codifying their knowledge of the land, its cycles, the need to respect it, and the management practices that allowed them to use the land and its resources in a sustainable way. This knowledge was passed down through the generations through stories, dance, ceremonies and the establishment of a network of sacred places. The Aboriginal system of environmental education continues today through family relationships and through special programmes in Aboriginal community schools and even in some progressive non-Aboriginal schools.

However, we also reported that unfortunately the Aboriginal vision of the land has not been followed by non-Aboriginal Australians despite the work of many committed people. The Aboriginal system of environmental education was quickly supplanted by a pioneering culture based upon the belief that the environment was valuable only in so far as it was productive. The consequent disregard for the environment throughout the nineteenth and much of the twentieth centuries meant that many mistakes were made. The results of this have been catalogued in the national State of the Environment Report which was published in 1996. The chief problems that were identified were: soil erosion, threats to bio-diversity through forest clearance, coastal development and urbanisation, the poor condition of the major river systems, and increasingly hazardous levels of air pollution in major cities - chiefly caused by motor vehicles.

Much activity has been occurring at the government level to address these problems. These began many years ago but have been accelerated by the influences of the Agenda 21 process initiated at the Earth Summit in 1992. Individual local and state governments as well as the national government have a range of laws which seek to provide appropriate impact assessment and planning processes. Perhaps, the most significant action in recent years has been the agreement by the leaders of all the state governments and the national government for a range of common approaches to environmental management. This began in 1989 when the Australian Government released a public discussion paper on a proposal to develop a National Strategy for Ecologically Sustainable Development (NSESD). The process was extensive and, over a period of two years from 1990 to the end of 1992, involved consultation and negotiations between key interest groups from industry, the community, conservation groups, scientific organisations and all levels of government.

At the national level, implementation of the National Strategy for Ecologically Sustainable Development has involved the development of a range of detailed policies, usually through mechanisms similar to those used to develop the National Strategy itself. National level strategies or policies now exist for Greenhouse issues, Forests, Waste Management, Coasts and Seas, Bio-diversity, Rangelands Management. Educational policy makers have been required to consider these strategies in school curricula in recent years.

At the State and Local Government levels, planning and development legislation increasingly reflects a commitment to Ecologically Sustainable Development and the National Strategies. These governments are tackling issues such as waste minimisation and cleaner production, land use and transport planning and natural resource management against a background of the national strategies. Local Agenda 21 plans are becoming a key feature of environmental management at the local council level.

ENVIRONMENTAL EDUCATION IN THE SCHOOL SYSTEM

It is against this background that environmental education has developed in recent years. However, it is difficult to provide a detailed picture of environmental education in Australia due to the complex nature of the education system in this country. The various State and Territory governments have major responsibility for education policy, the provision of schools, staff, syllabuses, and teaching resources in public schools. In Australia there is also a strong tradition of school-based curriculum development in which schools and teachers are responsible for developing the detailed objectives, content, teaching methods and assessment of student learning within the parameters of broad-framework syllabuses. This has led to much innovation and the development of programmes, including many in environmental education, which suit the needs of students in their individual schools and communities. This diversity of practice makes it difficult to keep up with what is happening and, coupled with the division of Australian education into eight State/Territory systems, makes the task of providing a national picture very difficult. A comprehensive review of environmental education policies in each State/Territory together with case studies of the diversity of environmental education programmes and activities found in schools may be found in Greenall Gough (1990) and Gough (1992).

We reported to the 1993 Seminar that the national government had begun to try to bring some co-ordination and uniformity to education policy and curricula across the various State/Territory systems because the operation of eight State and Territory education systems in a country with such a small population as Australia is very expensive and leads to much duplication of effort.

In 1989, the Commonwealth, State and Territory Ministers for Education agreed on the Hobart Declaration of ten "Common and Agreed National Goals for Schooling in Australia". These are reflected in the national curriculum process which has identified eight areas of knowledge for co-operative curriculum action: Studies of Society and the Environment, English, Foreign languages, Science, Technology, Mathematics, Health and the Arts. Studies of Society and the Environment is recognised as the "home" of environmental education but it is included also in Science, Technology and Health.

Actions in the field of Studies of Society and the Environment have included a national audit of environmental education materials and an in-depth review of the pattern of curriculum provision for environmental education in Australia through an analysis of all relevant educational policies and syllabuses in the country. The results of these reviews were incorporated into a National Statement on Studies of Society and the Environment and the development of Assessment Profiles through which a common pattern of describing student performance may be achieved. These agreed national documents are now being implemented in schools in ways that suit the priorities of each education system.

TEACHER EDUCATION FOR ENVIRONMENTAL EDUCATION

The general pattern of environmental education in Australia appears to be one of rising enthusiasm among students and teachers but a series of recent studies provide evidence of a need for caution in claiming that good practice in environmental education is widespread. The lack of adequate professional development at either the pre-service or inservice levels has been found to be a major cause of this. For example, Spork (1992) has researched teachers' perceptions and practices of seven aspects of environmental education: teaching about natural systems, teaching about people-nature interactions, teaching skills to investigate the environment, teaching positive attitudes to the environment, teaching skills for investigating and clarifying environmental issues, teaching problem solving, and teaching through and for environmental action. The first three of these relate most closely with education in and about the environment whilst the last three are essential aspects of education for the environment.

When asked to report on their own practices in these seven aspects of environmental education, the teachers said that education about and in the environment were their most common approaches to environmental education. Teaching information about the natural environment (98.2%) and positive attitudes to the environment (91.2%) were the most commonly reported aspects whilst teaching through investigating and clarifying environmental issues (28.1%) and through taking environmental action (19.7%) were the least common. This pattern of practice occurred despite the fact that almost all the teachers rated all seven aspects of environmental education as "important" or "very important" in another part of the survey. The sharp drop-off in attention to the critical aspects of education for the environment means that the end purposes and full educational potential of environmental education are being lost - and that environmental education is not being implemented according to international or state guidelines in the schools in the region surveyed.

Lack of teacher education and professional development was found to be a major factor in the explanation of these patterns. When asked about their pre-service teacher education experiences, only 4.9% of the respondents said that they had undertaken any studies in environmental education whilst over 85% claimed that they had received no training at all in environmental education through pre-service, inservice (only 6.6%) or post-graduate studies (3.1%).

Actions being taken to address such problems can be seen in an examination of teacher education at three levels: pre-service teacher education, postgraduate education studies, and inservice education.

Pre-service Teacher Education

Spork's research revealed a general pattern of inattention to environmental education in Australia. A review of 1996 university handbooks revealed that no pre-service teacher education programme in Australia mandated environmental education studies for all trainee teachers. However, several universities provide course structures which allow students to study a one semester elective in environmental education or to choose to specialise as environmental education teachers. However, environmental education most generally appears as a short segment in the applied curriculum studies programmes in geography, science and social education in many universities.

In Queensland, the Board of Teacher Registration (1993) has developed a policy to encourage pre-service studies in environmental education. This policy outlines the need for environmentally educated teachers and the ways in which this need may be met through pre-service teacher education programmes. It also outlines competencies (a) in the knowledge and skills of environmental studies, and (b) for curriculum planning and teaching in environmental education, which could form the basis of action in teacher education. However, the policy is an advisory one only. It was reported to the 1993 seminar that New South Wales, the Legislative Assembly passed a private member's bill to create an Environmental Education Act. This has still not been passed by the upper house, the Legislative Council, but the government has enacted some of its provisions. One of these was a review of environmental education in teacher education (Walker 1995) but this reports that there has been little development in this field. Similarly, the Victorian state environmental education strategy which was released in 1992 and outlined the important responsibilities of universities in relation to teacher education has not been implemented widely. This represents changing priorities of state governments in harder economic times.

However, the Australian government has been strong in its support of teacher education and has funded the development of several workshop manuals for environmental education and teacher education. These include *Teaching for a Sustainable World* (Fien 1993) and *Environmental Protection in Australia* (Fien and Martin 1996) and provide a total of 26 workshop modules which promote curriculum planning and innovative teaching strategies for teaching about global environmental and development issues and "brown issues", respectively. A series of national training workshops have been held to introduce teacher educators to these manuals. A workshop manual to help teacher educators teach about the marine and coastal environment is currently under development.

Postgraduate Environmental Education Studies

Australia is nearing the completion of a programme of upgrading the base qualifications of teachers from two years pre-service training (Certificate of Teaching) to a minimum of three (Diploma of Teaching) and four years (Bachelor of Education or Bachelor degree and Diploma of Teaching). This has predominantly involved part-time evening or off-campus study. Several universities have provided a one semester elective in environmental education in these upgrading programmes.

The present emphasis in postgraduate study for teachers is Masters degree study again mainly through part-time evening or off-campus modes. The first specialist Master of Environmental Education degree programme in Australia began at Griffith University in the Faculty of Environmental Sciences in 1991. The detailed objectives, content, teaching methods and assessment in this programme are described in Fien (1990). Similar programmes have been developed at the University of Canberra, Newcastle University and Macquarie University. Deakin University, Queensland University of Technology and Griffith University are among a number of universities that also offer professional development elective subjects in environmental education in Master of Education courses.

Inservice Education

This means that the continuing or inservice education of teachers will become increasingly important. Most inservice education for environmental education in Australia is provided by professional societies such as the Australian Association for Environmental Education or the Australian Geography Teachers Association with the Australian Science Teachers* Association also now beginning to play a role in promoting environmental education. These groups provide after-school seminars, day workshops and newsletters on a regular basis and sometimes a State conference for their members. Up until 1993, their major inservice activities are their national conferences which are generally held every two years.

A major positive development in Australia since 1993 has been an expansion of in-service education for teachers through a special National Professional Development Programme (NPDP). This is a nationally funded programme for curriculum and teacher renewal and has cost $Aus60 million over the years 1994-96. One of the significant aspects of NPDP is the direct funding of professional associations - in partnerships with universities and education systems - to conduct in-service education for teachers. The National Professional Development Program for environmental education is managed by the Australian Association for Environmental Education (AAEE). Almost $500,000 was made available between 1994 and 1996 to develop a series of training manuals and projects to develop teachers' appreciation of the issues, skills and resources involved in cross-curricular planning for environmental education. Seven professional development programmes have been developed.

Teaching and Learning Through the Environment is primarily for K-7 teachers and focuses on curriculum planing and teaching methodologies for environmental education, in particular those which deal with values and action. It is a sixteen hour course which can be provided in eight two-hour workshops or over a weekend. *Teaching and Learning Through the Environment* courses have been conducted in several parts of the country and is a regular feature of national professional development summer and winter schools for teachers.

Teaching for a Sustainable World, had already been developed in 1993 and focuses on teaching about global environmental and development issues. The modules in *Teaching for a Sustainable World* are adaptable to a wide range of ages but are particularly to upper primary and secondary level teaching. At least two persons from each education system in Australia have been trained to conduct Teaching for a Sustainable World workshops for teachers.

Environmental Education Across Australia was originally written as a distance education program to allow any teacher in Australia to explore the nature and scope of contemporary environmental education, and then to examine seven case studies from Australia schools presented on a video. The aim is for whole schools to use the program to examine their offerings and thereby develop a whole school approach to environmental education. This program has reached many teachers across Australia but has primarily been delivered as a weekend course rather than through distance education, as intended.

Catchments, Corridors and Coasts: Promoting a Landcare Ethic is a week-long course which promotes Landcare education principles and resources to increase teachers' content knowledge and teaching skills for a range of land management issues related to catchments and coasts. This programme has complemented a range of other in-service education initiatives for Landcare in several parts of Australia.

Biodiversity and Ecologically Sustainable Development was developed in the Northern Territory. Initially a distance education program because of the low density of settlement in this remote part of Australia, it was based on specially commissioned case studies about the bio-diversity of arid and savannah landscapes. This programme has expanded and now five sets of case studies cover bio-diversity themes in wider geographic regions, including Indonesia and Indo-China.

Red Gold: Environmental History Through Story is a two day workshop on environmental history in Australia. It is presented by a team of five specialist drama teachers. The impact has been to lead teachers to research their local history, construct their own settings and adapt the methodologies to weave a story-thread into a powerful drama for their students. A training workshop has also been provided at a national conference of drama teachers to encourage others to include environmental themes in their drama-in-education activities.

Eco School: An ESD Approach is a programme which seeks to promote a whole school approach to resource management in a school. It requires a commitment by principal, staff and community to ensure changes in curriculum, school operational procedures, and personal and group lifestyles to bring about an ethos of conservation.

The National Professional Development Programme for Environmental Education as a whole is yet to be evaluated. However, there are several positive signs. First, all seven programmes represent a three way partnerships between AAEE, a university and at least one education system. Second, many teachers have taken the opportunity to participate in the design and delivery of their own professional development. For every dollar provided by the Australian government it appears that teachers have put in the equivalent of another two dollars. This is due to the voluntary nature of much of the materials development and the conduct of most of the programmes outside of schools hours, particularly on weekends. Third, some of the programmes have voluntary assessment components and can lead to credit in university postgraduate courses. AAEE is also issuing certification for teachers who complete particular professional development tasks and all employing authorities have been invited to recognise these certificates in the promotion of teachers. Fourth, AAEE has conducted a national train-the-trainer course in February 1996 and now has twenty professional development leaders capable of delivering one or more of the programmes in their local regions. These trainers have offered several of the programs in places as far flung as Adelaide, Hobart in Tasmania, Townsville in north Queensland, Perth and Kununurra in Western Australia, and in the Northern Territory. The challenge is to see whether teachers can continue to be attracted to the programs from 1997 when there is no national government funding.

CONCLUSION

This paper has provided an overview of the challenges to sustainable development in Australia and the range of government policies, including those in education, being developed in response to these. The early section outlined some of the developments in environmental education since 1993 and the challenges these pose for teacher education. The final section of the paper described the relative lack of attention to the environmental education of pre-service teachers but emphasised the positive developments that have occurred since 1993 in the area of mid-career or in-service professional development in environmental education.

REFERENCES

Board of Teacher Registration (1993) *Report of Working Party on Environmental Education in Teacher Education in Queensland*, Board Of Teacher Registration, Brisbane.

Fien, J. (1990) Accepting the dual challenge for professional development in environmental education, *Environmental Education and Information*, 10 (1), 1-18.

Fien, J. ed. (1993) Teaching for a Sustainable World, Griffith University, Australian Association for Environmental Education and AusAID, Brisbane.

Fien, J. and Martin, L. eds. (1996) *Environmental Protection in Australia: A Workshop Manual for Teachers*, Griffith University, Brisbane, for Environmental Protection Agency, Canberera.

Gough, N. (1992) *Blueprints for Greening Schools. Principles, Policies and Practices for Environmental Education in Australia*, Gould League of Victoria Inc., Australia.

Greenall Gough, A. (1990) Environmental education, in K. McRae, ed, *Outdoor and Environmental Education: Diverse Purpose and Practices*, Macmillan, Melbourne.

Spork, H. (1992). Environmental Education: A Mismatch Between Theory and Practice, *Australian Journal of Environmental Education*, 8, 147-166.

Walker, J. (1995) *Environmental Education in Teacher Education in New South Wales*, unpublished report, University of Western Sydney.

CHINA

Hao Bing

The P-R-E Status in China

Population

By July 1990, the 4th census showed that the population in mainland China reached 1130 million.

Table 1. Population status of four censuses (million)

Year	1953	1964	1982	1990
Total	582.60	691.22	1003.91	1130.51
Male	301.79	354.79	515.28	581.12
Female	280.81	236.43	488.63	548.69

Although the strict birth control policy-one child one family has adopted and the birth rate has declined from 39.14%(1964, the highest rate since 1949) to 19.68%(1991), the average annual growth of population will still be 15 million from 1990 to the end of this century, the total number are expected to reach 1.3 billion by 2000.

Resources

Take cultivated land as an example. In 1957, the cultivated area in mainland China reached 1677.45 million mu, the highest in Chinese history. Since then, it was decreasing by 500,000 hectares per year in the past 39 years. In 1952, the cultivated land per capita was 2.82 mu, in 1991, it was less then 1.24 mu, with a decrease of fifty per cent.

Table 2. Cultivated land (million mu 1mu =1/15 acre)

Year	1952	1957	1962	1970	1980	1990
Total	1618.78	1677.45	1543.55	1517.02	1489.65	1435.00
Per Capita	2.82	2.59	2.29	1.83	1.51	1.26

Due to the rapid growth in creasing economy, it is unavoidable from the occupancy of arable land for construction. But "from 1957 to 1986, the decrease of arable land was 610 million mu accumulatively, and the net decrease was 7.9 million mu. In the year 1993 the reduction even reached 9.37 million mu." "At present, the net increase of population is 16 million annually in China, If such a trend of the sharp drop in arable land area and the rapid increase in population can not be controlled, the arable land area per capita will decrease to 0.6 mu after 50 years, an how much could be left for our coming generations 100 years after?" "Such a large extent lost of arable land can not be tolerated by any country, particularly in China." (R.H. Li, President, Chinese People 's Political Consultative Congress, People's Daily, July, 2, 1994)

Environment

The problem of deforestation, deterioration of grassland, soil erosion, desertification are "locally improved but getting worse in general". One of the by-products of the development of township and village enterprises is the former "pollution in points " now transforming into the "pollution on surface". The traditional Chinese philosophy believe that humans are a part of the nature, and have to live in harmony with it. But now the P-R-E relationship is bogged down in crisis, and that will definitely restrain the economic and social development of the country.

A series of policies have been laid down to mitigate the contradiction. The Chinese Agenda XXI has been published, which include 74 project in 20 chapters. But it is doubtful whether the policies and measures would prove to be effective, if the critic; important factor - the quality of the citizen, the awareness of environment, resources and human-earth relationship of the people, could not be improved comprehensively.

The Education System and EE in China

Curriculum and EE

There are about 200 million primary and secondary school students in China. State Education Commission requires the curriculum for the pupils of compulsory school age. In primary school, the curriculum is organised on the basis of five or six grades. The following nine subjects are included in the primary curriculum: moral, Chinese literature, mathematics, society, science, physical education, music, art and practising activity. In secondary school, the curriculum is organised on the basis of four or three grades. The following thirteen subjects are included in the secondary curriculum: moral, Chinese literature, mathematics, foreign language, history, geography, physics, chemistry, biology, physical education, music, art and practising activity. In schools, the teaching-learning process depend on the textbooks very much and the teachers have no opportunity to choose the textbooks themselves. Nearly all schools use the textbooks published by the People Education Press, which is attached to the State Education Commission.

We need to take the existed education system to implement environmental education because we can not ignore 200 million students. According to this system, students can learn knowledge about environment effectively. But we know clearly it is not enough for them. EE is " To develop a citizen that is aware of, and concerned about the total environment, and its associated problems, and which has knowledge, attitudes, motivations, and skills to work individually and collectively toward solution of current problems and prevention of new ones." Hopefully, EE can contribute to the innovation of education.

Examination and EE

Examination is a social problem that reflects a tension that has confronted contemporary Chinese primary and secondary schools for nearly twenty years. The people who graduate from universities and colleges can get better jobs and higher social position than those do not have the background of high education. To gain the recognition by the public and by the authorities, all the schools stress examination. Therefore both teachers and pupils focus on the subjects which is required in entrance examination rather than on EE. Even if some environmental information is included in these subjects, how can you evaluate the value, attitude and behaviour which are the more important dimension of EE?

The Module of Teacher Training for EE in China

Teacher training for pre-service teacher

The pre-service teacher training is mainly conducted in normal colleges and universities nation-wide with 566,600 students. Environmental education for these students has been strengthened. Department of environmental sciences has been established in some normal universities. In more normal universities, courses relevant to environmental science have been offered to students in different departments, e.g., " Introduction to environmental science" has been taught in department of biology. There are several universities where inter-departmental elective course of environmental science has been offered for the purpose of fostering students to infuse environmental education into the main subjects they teach when they become school teachers.

Teacher training for in-service teachers

In-service training includes the environmental education for teachers in different educational institutions as well as in a variety of short-term courses. For example, the Environment Protection Office of the State Educational Commission and the Educational Office of the National Environment Protection Agency jointly held a national training course on EE for principals and deans of studies in secondary schools in 1993. similar training course was held in summer ,1994. In addition, regional and local education agencies and environment protection also have held training classes for secondary school teachers, which result in the successful implementation of environmental education.

Problems cited by teachers during the process of teacher training

1. concept of environment is too wide, it seems to include the whole of education.
2. EE is often related to problems. It can lack coherence rigor when taught as part or the whole of a subject.
3. The issues raised have no easy answers. This makes the position of teachers to as authorities in their subject difficult.

4. EE is multifaceted; it is difficult for teachers to teach across different subjects. There is often an unwillingness to do so anyway.
5. No particular subject specialist will take responsibility for this area of curriculum.
6. EE has not been identified as a priority by government. Therefore funding for training is low.
7. Enthusiastic teachers may tend to use teacher-centred methods rather than educational methods.
8. Methodologies appropriate to teaching in EE have not yet been widely disseminated.
9. There are problems of satisfactory assessment; because EE is often concerned with higher order cognitive abilities or affective areas of education.
10. There are no flexibly for the teacher to choose the topic.
11. Lack of materials for EE in all levels.

The EE Teacher Training Plan of WWF China

It was recognised that for many teachers, experience of teaching on formal programs specifically entitled environmental education may not have occurred. Consequently it was considered appropriate to concentrate attention on those teachers who explicitly stated that they were involved in environmental education and to consider only their experiences in pre-service and in-service teacher training. WWF China set up an EE teacher training plan in order to provide teachers more opportunities and skills to involve in the environmental education. They are going to choose three Normal University in different regions as the training centres. In these centres, the master trainers will be the experts co-operative team in this area . These training centres are EE information centres as well. There are three groups of people will come here to receive the training. Teachers who come from colleges and schools which specially for training primary school teachers will do the pre-service training work after they come back. Researchers who come from the different Province Educational Research Institutions will take responsible for the in-service training work. The third group people are the head teachers from primary school and the officers from Educational Bureaus because the environmental education need their support. Various teaching-learning resources will be developed at the same time. The project will start in next April.

References:

Xu Jialin, Wang Hongqi, Yang Mingchuan and Hao Fanghua, (1996) *Environmental Education for Sustainable Development - Teachers' Guidebook for Environmental Education in Middle Schools*, Beijing Normal University Press.

Xu Hui & Zhu Huaixin, (1996)*Theory and Practice on the Development of International Environmental Education,* Hangzhou Publishing House.

Leslie Honour & Hao Bing , (1995) *Geography and Environmental Education in the School curriculum in Great Britain and China: A Comprehensive Perspective,* (unpublished) the Paper for Presentation at International Symposium on Primary and Secondary Education for the 21st Century

Hao Bing (1995) *Report of Environmental Education in Britain and China,* Great Britain - China Centre, London

FIJI

Premila Kumar

Introduction

The Fijian societies have always depended on the natural environment for their sustenance and survival. Environment has been an integral part of their physical, social, cultural, economic and spiritual life. Environment was regarded as a source of life and respected and nurtured through the various ceremonies and communal activities that enhanced custodian ship of natural resources. Awareness of the physical limitations of their environments which includes the carrying capacity for population led to the development of mechanisms to prevent over-exploitation of resources such as taboos imposed by chiefs, priests and appointment of a hereditary 'resource management specialist' as custodians of specific land and marine resources.

Today's Pacific Island nations are part of the global economy. The natural resources such as land, forest, marine, minerals, and hydro-energy generate the bulk of Fiji's GDP and export earnings. The Fijian society has taken for granted that the environment is a 'limitless' supplier of their needs and wants. It does not understand that there is a need to balance the utilization or harvesting of environmental resources with careful, long-term husbandry to ensure that social and economic benefits are sustained. It is of paramount importance to provide the people of Fiji with appropriate environmental education, to help them understand and prevent further degradation of their fragile and unique environment.

This paper is divided into two parts. The first part will discuss the recommendation made by Taylor in 1992 about the status of Environmental Education (EE) in Fiji which has become a segment of the National Environment Strategy (N.E.S.) for Fiji. The second part will focus on the progress made by the Government of Fiji (GOF) on the implementation of the recommendations by N.E.S. to upgrade EE in Fiji.

Recommendations Made by National Environment Management Project (NEMP) to Improve Environmental Education in Fiji

In 1992 the NEMP commissioned the Institute of Education (IOE) at the University of the South Pacific (U.S.P.) to carry out a study that would include a wide ranging review of EE in Fiji. This study was to identify deficiencies in EE in the curriculum and to propose a strategy to resolve the situation.

The following deficiencies were identified during the study:

- The curriculum for the primary and Junior Secondary years has little specific content on the marine and forest environment that make up two of Fiji's most important sustainable resources.
- The new junior secondary agricultural science course was full of factual material and

too advanced.

- Resourcing was a problem. Many schools use the subject text books to support their endeavors in EE.
- At senior secondary level, particularly in subjects like Biology and Geography, the recommended texts are written outside the Pacific region and therefore do not contain material that is local or relevant.
- The Schools Broadcasting Unit, being a potentially - useful resource in EE lacks the necessary fiscal and staff development structures.
- The teaching methodology used for the delivery of the environmental component of the curricula is such that it fails to bring about desired behavioral change in the students.

With particular attention being paid to the short comings, the following recommendations were made.

a] Development of curriculum material on Fiji's forest and marine environment and its inclusion in the primary and junior secondary curricula.

b] Review Agricultural Science, forms 3-7

c] Training workshops in EE to in-service advisers and teachers in each division.

d] Strengthening the Schools Broadcasting Unit for delivering EE

e] be assisted in developing specialist courses for inclusion in the Bachelor of Environmental Studies and Diploma of EE programs to make it more effective

The recommendation made by Taylor (1993) to improve EE in Fiji has over looked the importance of including EE in teacher education for pre-service and in-service programs offered by University of the South Pacific (USP), Fiji College of Advanced Education in Fiji (FCAE) and Lautoka Teachers College (LTC).

The progress made by GOF to implement the recommendations for upgrading Environmental Education

The following development in EE was seen after the recommendation made by N.E.S. in 1993.

A. Development of resource

A handbook for environmental education in Fiji is on the verge of completion. This hand book would comprise six portfolios on Rubbish, Fiji Forest, Fiji Coral, Marine, Weather & Climate and Geology.

Each portfolio contains several units:

Rubbish Portfolio

- Why we rubbish
- How much Rubbish does your family discard?
- Rubbish analysis on the school compound
- Rubbish analysis of a public area
- How long does it take for rubbish to decompose?
- Rate of decomposition of a compost pile

Fiji Forest Portfolio

- Characteristics of a rainforest
- Biodiversity of a rainforest
- Age of maturity for Fiji lumber trees
- Fiji's pine plantation
- Mahogany plantation
- Forest Harvesting

Fiji Coral Portfolio

- Coral and coral formation
- Types of coral and corals on the beach
- Reef walk
- Barrier reef community
- Sea shell and sea shells on the beach
- Diversity of organisms living in the coral head
- Food webs of the coral head

Marine Portfolio

- Sea turtles
- Yellow fin tuna
- Sea and shorebirds

Weather & Climate Portfolio

- A climate diagram of Fiji
- Global Warming
- Ozone

Geology Portfolio

- Geological formations of Fiji
- Plate tectonic of Fiji
- Rocks of Fiji
- Soil types of Fiji
- Soil Erosion

The general feeling at the moment for the hand book is to give flexibility to the educator to use one or any combination depending upon the needs of the students or the type of problem.

B. Review of Agricultural Science (AG Science) Curriculum

The CDU is currently reviewing its AG Science curriculum to make it more localized. One aspect that is emphasized in the curriculum is the introduction of new technology in Agriculture and its impact on the environment. From 1997, the revised curriculum for form five & six will be taught in schools. In primary schools a brand new subject - Basic AG Science will be made compulsory to classes three to eight for the first time.

C. Schools Broadcasting Unit

It still requires technical assistance to strengthen its full potential in order to serve the schools in the area of EE.

D. Pre-service and In-service Programs for Teachers

i) EE Workshops for in-service teachers

For the first time a series of in-service training was held in Suva, Lautoka and Labasa. The first cycle, which was held in April, covered the following subject matter: methods for EE teaching; mangroves; geology; climate; waste problems; sustainable development; global warming and finally teachers spent time in developing the EE teaching units.

The second cycle focused mainly on developing EE teaching units on the following: coral reef; rainforest; Fiji pine; mahogany plantation; sand dune ecology and soil erosion.

The objective of the workshop were to:

- make participants aware of the important environmental issues in Fiji.
- get first hand experience of the ecologically troubled areas.
- trial certain portfolios
- develop the EE hand book for Fiji.
- experience the teaching methodology - especially in the area of student involvement.

Actually each portfolio had hands-on-activities and the trialing of each portfolio was followed by fieldtrips.

At present the view of MOE and DOE is to see that the series of EE workshops is an ongoing project. The projection for 1997 EE workshops is to:

- Address Fiji's critical environmental problems.
- Develop handouts containing quantitative data to complement the EE teaching units for teachers' use.
- Develop a hand book on teaching environmental issues.
- Develop a facilitator teaching program to assist participants and colleagues in teaching about environmental problems in Fiji
- Develop a joint program between MOE and DOE for the continuous in servicing of teachers in the area of environmental education.
- Complete the hand book for EE in Fiji

ii) Teacher Training Institutions

A. The University of the South Pacific

The Department of Education and Psychology offers pre-service and in-service program for secondary level and in service program for teachers wishing to upgrade their qualification or for graduates who are currently teaching or who aspire to become teachers.

The School of Social and Economic Development has introduced a new Diploma in EE.

All the above programs lack specific input on the scope, issues and teaching approaches involved in EE. The graduates are not suitably qualified in the area of EE. Therefore, MOE has to provide in-service training in EE. So far no specialist course in this area has been designed by the university. These teachers do not feel comfortable approaching a wide range of environmental topics in schools, nor embarking on field studies where the likelihood of being asked questions they may not be able to answer increases.

USP should consider offering formal training to the teachers in this area.

B. Lautoka Teachers' College

LTC launched its new course in EE this year which is offered as an elective at the college. However, environmental studies will be upgraded and offered as a core course as from 1997.

C. Fiji College of Advanced Education

Currently FCAE does not offer a separate course in EE but there are three approaches to EE identified at the college.

- As a major focus of a course; example, Pacific Studies offered to all trainees

- Integration into the course; examples in aspects of studies in Accounting, Economics, Home Economics, Chemistry, Physics, Biology and Geography.
- As a medium to achieve course objectives; examples as a topic in micro teaching or media.

A project proposal to develop an EE course for a pre-service program has been submitted. The intention is to begin the course by 1997. The course aims to

1. Develop an understanding of the nature and scope of EE with an emphasis on education for sustainable environment.
2. Provide ideas for implementing EE into the school curriculum
3. Develop an understanding of the range of social and environmental problems affecting the quality of life in Fiji.
4. Develop skills for identifying themes and activities in EE relevant to one's own areas of teaching.
5. Implement a wide range of innovative teaching strategies for effective delivery of EE
6. Develop an appreciation of Environmental values and plan the role schools can play to enhance awareness.

The major focus is to generate interest in environmental issues and to develop different perspectives, knowledge and skills for environmental inquiry and to various innovative teaching and learning strategies which can be used in EE.

Conclusion

Considering the short history of EE in Fiji, there has been a lot of development recently to strengthen the delivery and understanding of environmental problems in Fiji. A handbook for EE in Fiji was much needed to highlight the critical local problems.

The recommendation from NES report has been achieved to some extent and it is in the governments interest to see that the citizens understand the symbiotic relationship between man and its environment. Teacher training institutions also realises that with the infusion of environmental issues in the school curriculum, there is a need for formal training of teachers in this area. It is quite true that no matter how good the curriculum is or the resources are but if teachers do not teach environmental issues appropriately it will never bring about the desired behavioural change in the students. Therefore, it is important to provide teachers with first hand experience of environmental problems to make them realise a lot has to be done in the classroom.

References

Kumar, P & Tagivakatini, S. 1996. Fiji Country Report: Challenges and Responses to Sustainable Development in Fiji; a paper presented at the UNESCO Asia-Pacific

Regional Meeting. Brisbane, Australia.

Ministry of Education, Youth and Sport. 1992. Environmental Education in Fiji Schools. CDU, Suva.

Taylor, N. 1992. Environmental Education in Fiji: A Report for the National Environment Management Project. Institute of Education, University of the South Pacific, Suva.

Watling, D. and Chape, S. (Eds.) 1992. Country Report for United Nations Conference on Environment and Development (UNCED)- Fiji. SPREP, Apia, Western Samoa.

Watling, D. and Chape, S. (Eds.) 1993. The National Environment Strategy: Fiji. IUCN, Gland, Switzerland.

HONG KONG

Daniella Tilbury

Abstract

Preserving the natural environment and improving social environmental conditions are key sustainability issues for Hong Kong. Focusing on recent educational initiatives towards sustainable development, the paper reviews how priorities within formal and tertiary education present obstacles to change at the teacher education level. It argues that within the existing social and political climate, community groups in Hong Kong, hold the key to changes in teacher education for the environment.

1. Challenges to Sustainable Development in Hong Kong

Hong Kong is the world's most densely populated country (EPD 1994). It has a residential density of nearly 1,000 people per hectare. High levels of air, soil, water, waste, noise pollution and social problems such as cramped living conditions and poor quality housing have been the direct result of rapid population growth. The scale of such population pressures threaten the possibility of attaining sustainable development in Hong Kong.

2. Educational Responses To The Challenge Of Sustainable Development

2.1 Overview

Developments in environmental education at the school level have occurred essentially during the early 1990's. A review of policy and practice reveals that although there have been significant attempts to environmentalise the curriculum, environmental education provision remains marginal and ineffective. It is still to embrace the concept of sustainability. Few students have heard of the term 'sustainable development'(Lai 1996).

2.2 Guidelines and Policy

The year 1992, saw the release of 'Guidelines on Environmental Education in Schools' by the Education Department. This document sees the development of 'a lifelong commitment to environmental sustainability and protection' (CDC 1992 p.9) as one of its main objectives of environmental education in Hong Kong schools, but does not define what it means by sustainability or how it can be achieved. Furthermore, it makes no attempt to link environment and development concerns. Instead the guidelines mostly deal with the conservation and protection of the natural environment, neglecting issues such as unequal distribution of wealth, poverty, quality of life, environmental health and control of resources.

Its most valuable contribution is its interpretation of environmental education as a whole curriculum process. Its appendix provides a curriculum audit illustrating how environmental education can be integrated into all school subjects at primary and secondary level. However, unlike with other cross-curricular issues, such as civic education, and despite the recommendations contained in this document, no environmental advisory co-ordinating bodies have been formed (Lai 1996).

2.3 Trends and Experiences of EE in HK Schools

There are several problems with environmental education provision in schools:

1. Despite CDC recommendations (1992) for a whole curriculum approach, environmental education still lacks an interdisciplinary perspective. Geography and science are the main vehicles for environmental education, with civic education and social studies also covering environmental issues (Fung and Lee 1990; Lai 1996; Tilbury 1996).

2. The full range of objectives as defined by UNCED (1992) are not addressed through the school curriculum. There is an emphasis on knowledge acquisition (Lee 1995). The critical and creative thinking components together with the values clarification, citizenship and action skills of environmental education for sustainability receive little coverage in schools (Gerber 1990; Man 1993; Lee 1995). The political elements of environmental education are almost absent from the curriculum (Wong 1994). Instead the 'safer' and more traditional education ABOUT the environment approach is taken in preference to education IN and FOR the environment (Lee 1995).

3. There is often confusion over the real identity and goals of this area of learning with purely ecological and naturalist work often mistaken for environmental education. Environmental problems arose not as a result of natural problems but because of human mismanagement. Unfortunately, environmental education learning in Hong Kong schools avoids issues about how and why humans exploit the environment. Common activities labelled as environmental education include cleaning the neighbourhood, planting trees, learning ecology; recycling paper and cans. It does not recommend public participation in environmental decision-making and rarely promotes a critical understanding of the environmental problem (Gerber 1990; Man 1993). Instead of providing a basis for the development of critical thinking and action goals, practices serve as a vehicle for pupils to learn basic skills (Lee 1995).

4. The authoritative curriculum documents in Hong Kong promote active learning, encouraging teachers to manage learning rather than lecture in the classroom.

   The Curriculum Development Council's Guide to the Primary (CDC 1993a) and Secondary School (CDC 1993b) recommends the use of group discussions, visits; role plays, games, experimentation and practical activities. This was reinforced in their environmental education guidelines (CDC 1992) in which they state that environmental education 'learning should be experiential rather than instructional', that 'emphasis should be laid on the formation of attitudes' as well as on individual participation in the environmental debate (CDC 1992 p.34).

The classroom reality contrasts sharply with such recommendations. Findings from Wong and Stimpson's (1994) study into classroom teaching styles in Hong Kong revealed that although the majority of teachers adopt open approaches at the beginning of lessons that their teaching style becomes more restrictive as lessons proceed. This, together with the low priority given to inquiry approaches (Wong and Stimpson 1994) and active learning strategies such as role-playing simulations and games (Lee 1993), suggests that pupils are given few opportunities to experience the education IN and FOR the environment approaches. Similarly, teaching strategies which involve pupils in exploring personal values and responses are infrequently used in Hong Kong classrooms (Man 1993). Instead, traditional, teacher-centred and text-book based learning is perceived by teachers as most effective (Lee 1995).

This curriculum culture can be traced back to the inheritance of Confucian pedagogical tradition. As Fung (1992) explains,

> "the Chinese tradition of having high regard to the teaching profession may make some teachers think that classroom teaching is a very serious task and the teacher must very hard and look stern and sober in order to live up to the expectations of the general public... For them simulation games and role plays are but some frivolous pedagogical tricks."
>
> (Fung 1992, p.58) .

In many schools, classes range from thirty to forty or more pupils. This often makes the employment of didactic exposition more feasible than other strategies that encourage individual student participation. Furthermore, teachers, under the pressure of covering the overloaded syllabus content and helping students achieve better results in examinations, resort to traditional methods which emphasise direct and effective transmission of knowledge to the students.

This emphasis on rote learning and a highly structured classroom environment, can lead to students accepting fixed knowledge as well as blind conformity to rules. This entrenched situation also deters students from becoming independent, innovative, critical thinkers and decision-makers (Su, 1989) all vital components of environmental education for sustainable development.

5. The assessment and evaluation of students' environmental learning is a relatively neglected area. Few teachers appreciate the real purpose of environmental education, It seems that many schools evaluate the success of their teaching in terms of the frequency and range of activities and the number of awards or prizes won in competitions rather than transformative nature of the tasks.

6. The competitive and specialist curriculum culture within schools conflicts with the nature of environmental education. It is therefore, not surprising to find that environmental education is been increasing marginalized within the curriculum with exemplary practice flourishing only at the extra-curricula level.

Within this context, the examination system is a major constraint hindering environmental education (Stimpson 1993; Wong 1995). In Hong Kong's competitive environment, examination success is perceived to be of paramount importance by pupils, parents and teachers. The prospects of individuals are determined by their examination result. Those who graduate from higher education can look forward to more lucrative jobs and can aspire to higher social positions. Within this context, environmental education is not examined and is thus accorded a low priority.

3. Opportunities for Environmental Education at Teacher Education Level

3.1 Overview

In Hong Kong, there is no systematic monitoring or co-ordination of environmental education at the teacher education level. There are little opportunities for funding curriculum development or research projects in this area of learning. Attempts to increase the profile of environmental education are being overshadowed by a recent Government initiative concerning the introduction of the Target Oriented Curriculum (TOC) which is preoccupying many teachers and teacher educators. Research money and teaching programmes have been channelled to phase in this major curriculum innovation which has received much opposition from teachers.

There are no mandated courses in environmental education for all teachers. In reality, the provision of environmental education within teacher education, as in schools, remains in the hands of those committed individuals who push forward initiatives at this level. As a result environmental education at the teacher education level is still at an infancy stage.

3.2 Core and Elective Opportunities for Environmental Education

At the Hong Kong Institute of Education, sustainable development is taught in a three-hour lecture in the elective subject 'Environmental Studies' which focuses essentially on knowledge acquisition (Lai 1996). However, the compulsory subjects of 'Life Skills' give students opportunities to explore environmentally friendly practice and green lifestyle choices.

Efforts to infuse environmental education for sustainability into its primary course are currently being made by a committed member of staff. Through organising talks given by environmental educationists and seminars using the UNESCO modules 'Teaching for a Sustainable World' (Fien 1996), he is trying to motivate colleagues to address environmental education for sustainability as a whole curriculum concept.

Core provision for environmental education within initial teacher education at both the The University of Hong Kong (HKU) and Chinese University of Hong Kong (CUHK) is minimal. Neither University offers environmental education as a major or minor curriculum option, since there is no perceived demand from schools (Stimpson et al. 1993). However, the CUHK offers an elective course in environmental education in its PGD. The latter is rooted in a crosscurricula perspective and offers teachers an opportunities to consider how their subject specialism can contribute to environment education.

Course documentation suggests that the science PCEd/PGD courses cover much environmental content as do the BEd (social science) offered by HKU and the BEd (Primary Education) at CUHK, but only the geography PCEd/PGD courses currently integrate environmental education into its seminars.

Opportunities for environmental education are also offered by an MEd run by HKU. This Masters in Education takes up to sixteen students every two years. The programme attempts to encourage teachers to develop their perceptions of the environment and clarify their understanding of environmental education (Stimpson et al 1993). Most significantly, this degree also encourages teachers to become involved in curriculum development and evaluation.

Although CUHK does not offer a Masters course in environmental education its post-graduate students on the general MEd have the opportunity to write a dissertation on any area they chose. This may include environmental education.

3.4 Environmental Seminars

Recently, there have also been a number of short seminars on environmental education for teachers. The Advisory Inspectorate Division of the Government's Education Department organised seminars on 'Environmental Education in Action' for teachers early this year. The focus of the seminars ranged from exploring Urban Decay in Sai Kung Town, to workshops on the promotion of environmental education in social studies, travel and tourism, and included a series of lectures on environmental chemistry (to which 250 teachers attended). Seminar evaluations suggest that the teachers judged the sessions as successful. Close analysis, reveals that sessions took a primarily environmental studies and science focus. In their feedback, teachers requested practical and more curriculum focused sessions e.g. 'how to promote environmental education in the curriculum' and 'how to solve problems encountered in implementation of environmental education'. They also requested a workshop where teachers could share experiences and good practices in environmental education.

Previously, in 1991, HKU ran a forty hour INSTEP (In Service Teacher Education Programme) on Environmental Studies. This seminar, which was funded by Government, focused on the new issues-based, Liberal Studies course for senior secondary students.

No research has been done to evaluate the impact of these courses on school practice. The importance of evaluative research on environmental education initiatives is greatly underestimated in Hong Kong. It is an area which needs to be addressed, if any significant and long term developments in school practice are to occur.

3.5 Teacher Education in the Community

> "The support and active involvement of community organisations and groups is required for supplementing and widening the scope of EE within the formal system."
>
> (NIER/UNESCO 1993 p.14 4.2)

The year 1994 saw the formation of the Hong Kong Environmental Education Group (HKEEG) whose main objective is to encourage collaboration and support among conservation organisations and Government departments involved with environmental education in the Territory. This group of representatives from the Agriculture and Fisheries Department, the Education Department and green groups such as WWF and Green Power have done much to raise awareness of the need for environmental education amongst teachers. Their latest project was to research and publish a resource booklet on environmental education which provides teachers with a comprehensive list of environmental education facilities in Hong Kong. The booklet which was distributed to all schools earlier this year, invited teachers to work collaboratively with community groups to help develop environmental education through the formal curriculum.

The work of community groups such as Kadoorie Farm and Botanic Gardens, WWF, Friends of the Earth and Green Power have been vital in sustaining momentum for environmental education in schools. They have been influential in motivating teachers and providing stimulus for environmental learning. A recent WWF initiative included workshops for teachers with the aim of developing resource materials for schools. The organisers felt that the new resource might stimulate curriculum development in schools. The materials were distributed to schools free of charge, with support from a number of charitable organisations and private sponsorship. It is still too early to ascertain whether the materials have stimulated any significant or long term change in school provision.

The Environmental Protection Department is becoming increasingly involved in encouraging teachers to address environmental concerns through the curriculum. The opening of their Environmental Resource Centre has provided a valuable base for teachers interested in environmental education. The centre offers a reference library, CD-Rom and internet access as well as an environmental education activities corner.

Friends of the Earth (FOE) are committed to influencing the curriculum in Hong Kong schools making it more responsive to environmental concerns. They have run a number of Green Seminars for Teachers which aim to "update the knowledge of the teaching professionals on current issues" and "to make proposals in the field of environmental education in schools." (Liu 1993 p.223) .

As well as organising the seminars every year, this green group has an annual budget for buying and storing environmental education resources for teachers. FOE has been influential in keeping environmental concerns in the school curriculum.

4. The Future of Environmental Education for Sustainability

In the past, environmental groups in Hong Kong have played significant roles in defining the curriculum (Wong 1994). Now, such groups are actively promoting environmental education at a time when education has been too preoccupied with curriculum restructuring and research productivity. It is therefore not surprising to find that the momentum and focus of teacher education in environmental education in Hong Kong is shifting away from the higher education institutions. Environmental organisations are attracting more and more teachers to become engaged with environmental issues at the curriculum level, They have been more successful than teacher educators in putting the environmental education message across to practitioners. However, there is a central question which needs addressing 'how educational is this message?'. It is critical that teachers are seen as environmental educationists rather than environmentalists, especially as July 1997 approaches. Teacher educators should work closely with community groups in preparing teachers to address sustainability issues in the curriculum (rather than the other way around).

After the hand-over to China, institutions of higher education in Hong Kong will be subject to greater political and financial scrutiny - a climate which is not conducive to the development of education for sustainability. However, teacher educators could help sustain teacher education in environmental education through supporting environmental groups who hold the key to changes in teacher education for the environment.

INDIA

M. J. Ravindranath

Introduction:

India is a country of vast diversity, possessing a very rich environmental regime. As a matter of fact, India is one of the world's top 12 Mega diversity nations (Gadgil,91). On the cultural front, India has always had the pride of a culture which gave enormous importance and reverence to nature.

With all this, however, some where we lost the thread. We have allowed developmental considerations to subdue environmental considerations. Because of which, today, India is facing a major environmental crisis; a crisis arising out of the environmental problems which could be broadly classified under (Conservation Strategy,92):

a) those resulting from the negative impacts of the very process of development; and

b) those arising from conditions of poverty and under development.

Besides the rapidly increasing population (annual growth rate 2.11 per cent) which has put a heavy premium on the natural resources, the country is faced with problems of soil erosion and loss of soil fertility, dwindling forest wealth, diminishing faunal and floral diversity, pollution of life support systems such as water, air and land, shortage of fodder and fuel, increasing morbidity, etc. The National Report to UNCED (CEE, 92) on Environment and Development - Traditions, Concerns and Efforts in India succinctly focuses on the environmental problems and challenges faced by India.

Actions towards sustainable development:

Realising the importance of achieving sustainable development, the country in the post Rio years has taken up several measures for integrating environmental dimensions into developmental efforts. Recognising "Conservation and protection of environment" as the key element of the policy for sustainable development, the country brought out its National Conservation Strategy and the Policy statement on Environment and Development in 1992.

As the policy states "the primary purpose of the policy and the strategy is to reinforce our traditional ethos and build up a conservation society living in harmony with nature and making frugal and efficient use of resources guided by the best available scientific knowledge".

Environmental Education Efforts:

While several actions have been initiated at the national level for achieving sustainable development, what is being greatly realised is that it is only through EDUCATION that people could be made aware of and motivated to act for the cause of environment. As corollaries, efforts have been undertaken to:

a) introduce Environmental Education at all levels of education

b) augment the potentialities of education with other sectors of development such as economic, social, political, religious, legal, administrative and managerial; and

c) tryout and launch newer approaches and strategies of communication for creating necessary environmental awareness among the general public leading to environmental action.

These efforts have been intensified with the Supreme Court of India (Apex Court) passing a directive (1992) to all the education departments in the country to make Environmental Education compulsory at all levels of education including higher education.

Environmental Education in Indian School System:

India has a huge formal school system with enrolments running into millions. The system includes 10 years of schooling (primary & secondary),two years of under-graduate or intermediate stage and three years of collegiate education leading to post-graduation.

At the lower primary stage, i.e., up to classes V, Environmental education is introduced as integrated themes anchoring concepts of both natural and social phenomena. The content related to sciences, social sciences and environment are placed under a broad title "Environmental Studies".

Environmental Study I (Social studies) and Environmental Study II (Science) are intended to promote in children attitudes and values like objectivity, open-mindedness, perseverance, precision and concern for maintenance and improvement of the environment. Techniques like observation, recording details, interpreting the information collected, etc., form the core of the teaching strategy. Under Environmental Studies I and II are included concepts such as Earth as our home,. Climate, Soil, Forests of India, water resources, mineral wealth, live stock, etc. (Gill,95).

At the upper primary and secondary stages, environmental studies is given an interdisciplinary dimension by dealing with topics /concepts in physics, biology, chemistry, geography with an environmental perspective. The objectives at this stage are to help the children to develop sensitivity to the uses and misuses of sciences, as well as concern for a clean environment and preservation of the ecosystem. Environmental education is also infused into the teaching of other school subjects like mathematics, crafts and work experience, language, etc. It is worth mentioning that at this stage a number of concepts related to sustainable development find a place. To mention a few, it includes concepts such as " balance in nature", " human interference in nature", " natural resources and their conservation", " population dynamics" , " ecosystems", " wildlife and forests conservation", etc.

Endorsing the recommendations of Jomtien Conference,1990,the country has introduced specific minimum levels of learning at all levels of school education. Viewing environment as a integrated whole of the interaction among man, the natural environment and the social environment, 10 basic competencies have been identified for specifying the minimum learning needs.

These competencies aim at the cognitive, affective and psychomotor domains of development together with environmental education content.

While the above reflects the changes made in the structure and content of school curriculum for bringing environmental education bias, it is appreciated that salutary effect of these changes will not sustain unless they are accompanied by appropriate teaching-learning material in environmental education, teacher training and mechanisms for sustained implementation and follow up of the programmes in schools.

Development and Dissemination of Environmental Education materials:

Realising the importance and need for quality environmental education materials for promoting environmental education in schools, several efforts have been made by Central and State Departments of Education (SDEs) and Non-Governmental Organisations (NGOs) in developing and disseminating environmental education materials. These materials include teachers' handbooks/guides, student workbooks, activity and laboratory manuals, test items and also subject related resource or reference books.

Taking note of the fact that environmental conditions vary from one region of the country to another and to supplement the generalised textbooks and resource books, the department of education, Ministry of Human Resource Development, Government of India, initiated a centrally sponsored scheme for promoting development and dissemination of locale-specific environmental education materials (MHRD,91).

So far, more than 40 locale specific Environmental Education projects have been completed in the country by the NGOs and a host of materials like activity booklets, teachers' guides/handbooks, workbooks, resource manuals, audio-visuals, etc., have been developed and disseminated. Under the scheme, the State Councils for Educational Research and Training (SCERTs) have developed a large number of supplementary materials on the local environment and distributed to schools.

Training of Teachers in Environmental Education:

Realising the importance of teacher training in Environmental Education, a number of approaches and efforts have been made in the country for training teachers and resource persons.

Environmental Education at the Pre-service level:

Pre-service teacher training is organised at two levels; one for training teachers for teaching at the primary grades and the other for secondary grades.

At the Primary level, teachers are prepared through a two year course called as **Teachers Certificate Higher course**. As part of this, teachers are oriented to the basic or foundation courses such as Education in Emerging India, Educational Psychology and Administration, etc., and to specialisation in teaching methodology like Teaching mother tongue, Mathematics, Science and Social sciences. Since Environmental studies forms part of the primary school curriculum, teachers at this stage are trained in both the content and methodology of teaching this subject. At the national level, National Council for Educational Research and Training (NCERT), New Delhi has brought out detailed guidelines and syllabi for preparing teachers for primary level and teaching of environmental studies forms an important component of this curriculum.

At the Bachelor of Education (B.Ed) level, two distinct approaches have been followed in the country in introducing environmental education. These are:

1. Offering environmental education as a separate course
2. Integrating environmental education with other subjects/fields of specialisation

Environmental Education as a separate course: Under this approach, environmental education is introduced as one of the optional or elective papers. The syllabus includes both content and methodological aspects of environmental education. The course, in general, include:

1. Introduction to environmental education- meaning, trends and perspectives.
2. Basic concepts relating to environment and sustainable development
3. Human interventions in natural processes of the ecosystem
4. Human activities that affect material flow
5. Solving environmental problems
6. Approaches and methodologies of teaching environmental education
7. Evaluating environmental education programmes

A few other universities have introduced Diploma and Certificate courses in Environmental Education and Management. These are inter-disciplinary courses of short duration (two to three semesters) involving field trips and practical, sessions.

At the Master of Education (M.Ed) level, environmental education has been introduced as a distinct course in a few university education departments. These courses stress more of the content than the methodology of environmental education, interspersed with practical and field trips. It is worth mentioning that environmental education has also increasingly become the subject of research in many universities and research institutions leading to M.Phil and Ph.D degrees.

Initiative by CEE: The Centre for Environment Education (CEE), a non-governmental organisation has started a major initiative of developing and validating a course on environmental education for B.Ed students and institutionalise it in all the B.Ed colleges in the state of Karnataka, S.India. The project involved development of a curriculum in environmental education for B.Ed students, trialing it in on an experimental basis in a few B.Ed colleges and assessing its effectiveness. The curriculum and other teaching materials have been developed and tried out in 10 B.Ed colleges during the year 1995-96. The course deals with such aspects as a) Our Environment; b) Processes in Environment; c) resources, problems and management; d) Environmental education and e) Evaluation in Environmental Education. The unit on Resources, Problems and Management touches many aspects of sustainable development and issues related to it. The teaching methodologies used by the colleges for transacting the content include field trips, demonstrations, case studies, discussions, seminar and paper presentation method, etc.

Environmental Education integrated with other subjects: This approach has been followed in a majority of university education departments and teacher training colleges in the country. Through this approach, pre-service teacher trainees are required to examine the content in their areas of specialisation (like physical science, biological science, mathematics education, geography education, etc.) and weave in the environmental dimension while treating the content and planning teaching strategies. In other words, student trainees are taught how to infuse Environmental Education in the teaching of their subjects.

In a few cases, environmental education is integrated as an exclusive chapter in the biological and physical science foundation courses, and in a few others it is included under the paper "Education in Emerging India". Besides this, the student teachers are made to examine the content in their areas of teaching specialisation and integrate Environmental Education bias in the treatment of the subject and methodology.

Environmental Education at the In-service level:

While the above have been a few significant attempts at pre-service level, considering the large percentage of in-service teachers to be trained in Environmental Education, massive efforts have been made by both government and non-governmental organisations.

At the national level, National Council of Educational Research and Training (NCERT) New Delhi and Centre for Environment Education, Ahmedabad, have been in the lead in organising Environmental Education teacher training programmes. At the state level, State Councils for Educational Research and Training (SCERTs/SIEs) have been playing a critical role in organising in-service training programmes in Environmental Education. An equally important role has been played by NGOs in the country.

As part of the New Policy on Education (NPE-86), more than 17.62 lakh teachers were trained between 1986-89. These training programmes were the efforts of Centre-State collaborations. Training in environmental education formed an integral part of these training programmes. In order to reach the vast number of teachers, from 1993-94, the programme has been expanded under "Special Orientation Programme for Primary School Teachers" (SOPT) with a view to training primary school teachers in the effective implementation of minimum levels of learning (MLLs). As mentioned earlier, teaching environmental studies (EVS) forms an important part of the curriculum at the primary stage.

To strengthen environmental education component in teacher training, a large number of audio and video cassettes are developed and used. These video cassettes relate to case studies of environmental problems/issues, particular ecosystems, people's movement in conservation, etc. These are also supplemented with handbooks for teachers and resource persons. The handbooks are designed keeping in view the learning needs of the age group 6 - 16 students and teachers teaching them.

More than 400 specialised institutions have been set up (one in each district) in the country to cater to the needs of providing effective training to teachers. Orienting teachers in the content and methodologies of environmental education has been one of the important tasks of these District Institutes of Education and Training (DIETs).

Another programme of the magnitude of the massive teacher training is the National Environment Awareness Campaign (NEAC) of the Ministry of Environment & Forests, Government of India. NEAC, though covers a wide range of target groups from school children to politicians, has contributed substantially to the promotion of Environmental Education in schools. NEAC is a nation wide programme and several NGOs and government agencies take part in it by way of organising Environmental Education seminars/workshops for teachers, rallies, carnivals, field trips, nature camps, etc. As a part of this nation wide campaign, the Centre for Environment Education (CEE), Ahmedabad, an NGO supported by the Ministry of Environment & Forests, Government of India has been organising teacher training programmes all over the country. So far CEE has been instrumental in providing training on Environmental Education to more than 35,000 teachers, curriculum developers and planners with the active support and co-operation from state departments of education and non-governmental organisations. As part of the training, teachers are oriented in:

- the overall context of environment prevailing in the country and specific regional environmental issues.
- in the innovative and practical approaches of imparting Environmental Education to school children .
- the specific Environmental Education materials developed in the field and their integration into the school curriculum

It is worth mentioning that these workshops are built on the edifice of creating multiplier effect. In other words, the workshops are organised by resource persons who are trained by CEE. It is being hoped that in a few years there would be many resource teachers trained in Environmental Education in each district of the country, who could train other teachers in their schools or areas.

The Ministry of Environment & Forests also supports the concept of a network of eco-clubs through out the country in order to encourage the participation of school children in various activities related to the conservation of environment. Under this programme, schools are given financial assistance to initiate eco-clubs and carry out its activities.

Conclusion:

Although India has a long tradition of using environment as a basis for learning, a formal connotation to Environmental Education was given only after the Stockholm Conference and the then Prime Minister Smt.Indira Gandhi emphasising Environmental protection. To quote Smt.Indira Gandhi, she said that "Our environmental problems are not a side effect of excessive industrialisation but reflect the inadequacy of our development". From then on, concerted efforts have been made to promote Environmental Education at all levels of education - formal and non formal. While these efforts have helped in putting Environmental Education on the national agenda and weaving environmental considerations into all developmental efforts, one cannot remain complacent with them. There is much to be done to protect India's environment and attain sustainable development. This forges the need to work towards environmental friendly life styles. Needless to mention that this requires a holistic and comprehensive perspective to environment and its problems and efforts to circumvent and mitigate them.

INDONESIA

Ataswarin Muwardi Bambang Sarah

One of the biggest archipelagos in the world is Indonesia. According to the Indonesian Naval Hydro-Oceanographic office the total number of islands is more than 17.000. It is situated between two oceans, the Pacific and the Indian and two continents, Asia and Australia. This position has always influenced the cultural, social, political and economic life of the country. (Indonesia, an official handbook 1995).

The population policy is directed toward development of the population as human resources in order that the national development can be effective and valuable, while the quality of life is gradually improving. Mean while, the control of population growth is carried out through efforts to lower the birth and mortality rate, especially that of infants and children. The efforts in particular have been implemented through family planning programs which also have the purpose of improving the welfare of mother and child and at the same time create a small happy and prosperous family.

Like many countries, particularly those in the developing world, the city is always the major attraction for the rural population, INDONESIA is no exception. Over the years, cities have grown rapidly over the population, so that it is not very easy in coping with the impact of urbanisation. Prevalent are the pressing needs for employment, housing, transportation and other social requirements.

The Republic of Indonesia saw light on August 17, 1945, when its independence was proclaimed. Pancasila became the ideological and philosophical basis of the Republic.

Education programmes for environmental education must ensure that environmental considerations are taken into account in development projects, regional planning and resource management activities, especially with reference to economy, energy and other resources, development and dissemination of environmental technologies, prevention of pollution and promotion of healthy urban and rural environment.

The education of man as part of community development within the efforts of promoting the quality of life is internationally recognised as very important. Better perception on the relationship between population and environment should be further develop through education, training, up-grading, extensive service in the promotion of environmental awareness.

The role of governments and other stockholders in providing environmental education will result in guiding points on the success and failure factors. "Curriculum greenings" in many countries is evidently variative,depending on the socio economic and cultural conditions and governments policy. Environmental Education is therefore necessarily very important.

The basic concept and objectives of sustainable development at national level are being reflected in the government policy in the field of environmental management, which has the main objectives of:

- Achieving harmonious relationship between man and the living environment as an objective of Indonesian individual in his totality, to develop him as proponent of the living environment;
- Implementing national development with environmental considerations, for the interest of the present and future generations.

To render such objectives effectively achieved, the government has the obligation to cultivate and promote the citizens awareness of their responsibility in the management of the living environment by means of information, extension services, guidance, training and education, and research in the field of living environment. Living environment here is a system embracing the organic and inorganic natural environment, the man-made living environment, the social, economic, and cultural environment which collectively influences the sustainability of life and the welfare of man and other living organisms.

Educational efforts to initiate and enhance environmental awareness among the citizens are being carried out both through formal and non-formal channels as well, at every stage and level, relevant to each special need.

Global awareness of the **anthropogenic** nature of environmental pollution and degradation have enhanced governments over the world to promote and intensify the implementation of environmental education as part of the national educational system. In Indonesia, environmental education has been accepted as a must and has for over. A decade been provided to the community by means of formal, non-formal and informal channels.

Formal environmental education has been provided to the elementary school children as part of the curriculum subject matters (biology, chemistry, physics, geography, etc.). The same is true with regard to the secondary level schoolchildren (junior and senior high schools. At graduate levels, the provision of environmental education is based on the university academic autonomy. Many faculties provide environmental subject monolithically at the first semesters, compulsorily or optionally. Postgraduate programmes offer degrees (Master, Ph.D.) in environmental sciences, in most great universities.

Non-formal environmental education is mostly provided in the form of skill-enhancing training courses to graduate participants, such as environmental impact assessment/analysis (EIA), environmental audit, life-cycle analysis and rural community programmes. Environmental education have been continuously provided to larger target audience, such as women associations, youth organizations, NGOs, small to medium scale industries, and grass-root organizations. The informalities contained in this method of educational provision have rendered informal environmental education most preferred and prioritised in terms of its easy access into community-based development programmes.

Local/Regional administrative governments authorities have also significantly contributed to the success of environmental education implementation. The elementary and secondary level school children in the Jakarta capital city have for long been benefited from the provision of what so-called (**locally** specific oriented" environmental education, i.e. the "***Pendidikan***

Lingkungan Kehidupan Jakarta" **(PLKJ) (Environmental Education on the Urban Living Environment of Jakarta).** This PLJK provided to the pupils from **first to sixth** grades for elementary school and first to third grade for Junior High School (secondary level). The transfer of this specific environmental knowledge are conducted through class instructions method, supported by a portion of practical learnings such as sites visit and observation.

What is remarkable in terms of the module's course contents is that a great part of the topics being given to the pupils has similarities with the topics contained in the modules which have been consensusly suggested and agreed during the workshops in Noosaland, Brisbane, Australia 1996.

Even though evaluation on the results of such specific, local environmental modules implementation has not been formally conducted, but such effort is considered a great step and progress viewed from the government political commitment concerning the urgency of environmental education. Indeed, it evidently reflects the world environmental slogan, i.e. **THINK GLOBALLY, ACT LOCALLY.**

At national level, environmental education should be recognised as an integrated component of the national education system as a whole in this particular respect, the Government should issue national guidelines of environmental education, for all levels of education in the country, i.e. first, secondary, and tertiary levels; respectively.

The implementation of the guidelines into technical curriculum and modules at each level of education should refer to the national policy and guidelines which constitute as general basis for more specific curriculum and modules, regional or local wise. The local contents could be designed in the forms instructionals or case studies, complementary to the formal/conventional curriculum.

At international level, a network of collaboration between agencies charged with those particular tasks of each interested country should be developed. The country representatives should periodically meet and share, exchange, and discuss together their experience and country practices in the field of environmental education. To render the collaborative forum effective, specific working commissions should be established within the network, each in charge with environmental education for first, secondary, tertiary level of formal education, non-formal and community-based education, respectively.

JAPAN

Shigekazu Takemura, Haruhiko Tanaka and Hiroshi Shimono

I. Summary of Discussion by the Central Council on Education

1. Environmental issues and education

(1) Problems of today

The expansion of socio-economic activities and increase in population have gone beyond a natural ability to restore environment and have caused global environmental problems such as the greenhouse effect, the destruction of the ozone layer, desertification, the deforestation of tropical rain forests, a decrease in the number of wildlife species and acid rain. Problems which are characteristic to cities and closely linked with people's everyday lives are also impatiently waiting for solution.

(2) Coping with environmental problems

While contributing to international efforts, it is important for us to improve and change our socio-economic system and mode of life in Japan so as to be less damaging to the natural environment.

It is also imperative to enable learners to acquire view of "the Spaceship Earth", to understand the relationship between the human being and the environment, to co-exist with nature and to actually start from activities in their everyday life.

2. The improvement and consolidation of environmental education

In Japan, 'Environmental Education' is rather a new concept. Although some contents included in EE have been touched in some subjects in elementary and secondary education, EE has been so far of secondary importance, particularly in secondary school science. It is probably due to the fact that most teachers could not easily identify and integrate contents of EE into the traditional framework of formal education.

The importance of environmental education is growing. Schools are expected to cope with this theme by referring to diverse activities and utilising features particular to the school or the community.

Environmental education should be tackled in every educational activity at school through the co-ordination of subjects, moral education and special activities.

The understanding of the relationship between environment, nature and human being must be deepened. Care for environment and nature and an attitude to value them must be fostered. A positive attitude toward taking the initiative in conserving the environment and establishing the better environment must be fostered.

Experience-based learning must be emphasised in environmental education. This means that in environmental education, children should not learn only through classroom teaching. Activities which enable children to feel the importance of environment in nature and in the local communities, to become physically aware of the problems, to know what is required for a possible solution and to then in turn understand what they should do, are most important.

II. Putting Environmental Education into Practice

1. Prospects of Environmental Education

Recently, various educational reforms are being implemented by the government through some agencies like the National Council on Educational Reform and the Central Council for Education. In preparation for the 21st century, there are more going debate and discussion than ever before regarding the education that can deal with the enormous social changes resulting from internationalisation and information technology.

The present course of study is being revised and the 6th revised version will be promulgated soon . In its revision, the following items are considered:

1. Selection and reduction of the learning areas to make it suitable within the 5 school days
2. Consequent establishment and introduction of a new learning area on "Integrated Learning"
3. Education responsive to social changes

Based on the second and third items, there is a need for education to be information-oriented, scientific, environmental and deal with international understanding. This calls for a curriculum that is interdisciplinary in nature and approach. It is expected, with these intended classes, that teachers/schools could have more freedom and discretion regarding the contents to be taught and therefore, various types of lessons could be delivered. In connection with such intended classes on EE, there is a need to integrate systematically separate areas of EE in each subject in elementary and secondary education.

2. Designing environmental education curriculum

Among the teams of special researches on "Comprehensive Researches on the Improvement of School Curriculum", there is a research team on environmental education at this institute.

The team has been discussing the necessity of showing more concrete content and strategy in order for the wider operation of environmental education.

For this purpose, the following would be suggested as agenda.

- The content of the Course of Study which are relevant to environmental education and the link among them must be clarified and the way of co-operation among different subjects must be considered.
- Themes such as "soil" and "water" which can be formed into a unit in environmental education must be selected and main teaching materials must be developed.
- Feasible subjects such as "Environmental Studies" and "Global Citizenship Studies" must be planned and developed.

In order for putting environmental education into practice, it is important as a basis that learners understand scientifically the earth's natural environment.

This means that they need to acquire scientific knowledge, ability and attitude as citizens. For example, they can tell approximately the nature of natural things and phenomena and its relation with their everyday lives and assume what will happen based on this knowledge.

Learners are expected to be able to do the following:

- To perceive nature.
- To recognise change in the natural environment.
- To recognise relationships between human beings and nature.

These become the basis for recognition of nature. At the same time, they are critical issues for the formation of the fundamental concepts of environmental conservation and the protection of nature.

3. Introduction of another UNESCO Project

Another important project is the UNESCO Project 2000+: Scientific and Technological Literacy for All. Although EE is not particularly highlighted in this project, it seems important that the environment is taught in connection with the context of this project, as one can learn scientifically from, about and for the environment. Such an approach is useful in EE in schools since EE can be dealt with from a multi-faceted perspective in subjects by doing some activities.

III. Case Studies

1. Environmental Education in the Primary Schools

The contents of the present course for the Grades 1 and 2 of the primary school, include activities wherein teachers allow them to observe parks, fields, rivers, forests, and mountains in order to acquire interest with the environment. They would have the chance to walk around to foster direct contact with nature in order to inquire about nature and various natural phenomena

Such activities include walking, picnicking, orienteering, mountaineering, and observing the greeneries of the surrounding fields. They collect seeds, nuts, coloured leaves, and other objects. They make investigatory maps by themselves. They help in cleaning the forests, parks and streets by sweeping. They make calendar for flowers, trees, birds, and other living things. They make observation guides for the 4 seasons, namely: spring, summer, autumn, and winter. They also make a yearly calendar indicating the time various kinds of insects, birds, flowers, and others would appear.

The pupils in the middle grades deal on contents that could allow them become familiar with the natural environment. They can enjoy activities in making the environment clean by not allowing streams, rivers, forests and parks to become dirty. Teachers attempt to inculcate in them the desire to be active in protecting nature. The pupils in the middle grades perform activities which include producing flowers in flowering pots and gardens in their own houses, schools and communities.

They are involved too in collecting various household waste such as old books, magazines, cans, plastic products, and others. These classified materials are then brought to the community waste collection centres.

Teachers of the upper grades help the children acquire understanding on the importance of protecting the environment so that they could learn various methods of solving environmental crises. The upper graders deal on learning the webs of life. They study food chain by observing the ecology o fish and other living things by using aquaria. They also study the ecology of the forest thereby acquiring an understanding on how plants and animals produce oxygen and carbon dioxide respectively. They engage in acquiring understanding about various environmental crises such as the production of acid rain. They deal on activities such as "a planting movement," and "cleaning river, bushes, and forests regularly." They are engaged in recycling materials such as newspapers, cans, and others that are discarded daily. They acquire the understanding of the social system involved in garbage disposal, collecting, processing, and other cleaning tasks, and the co-operative participation in these activities.

2. Environmental Education in the Lower Secondary Schools

An Idea for Observation Which Treats Soil as One Environmental Element

It is preferable that children develop interest in soil which is an important environmental element of the earth just as the air and water.

(1) Observation of soil

In observing the appearance and quality of soil and its relation with animals and plants in natural circumstances, children learn the difference of the surface of soil caused by the weather and seasons, the influence of deforestation and housing lot development in the area. To observe what is particular about change shown on that piece of soil and to compare the difference between soil from various places can be identified.

(2) Comparative observation of soil by using plants

Collecting soil on a cliff where red clay is covered with black soil, to sow seeds on it and compare the difference between red clay and black soil based on the way the plants grow shows for students because they can observe soil as part of the environment.

(3) Observation of the decomposition of rubbish buried in the ground

The examination of the decomposition of rubbish process shows that time needed for decomposition is shorter in black soil and in warmer seasons. The number of micro organisms changes depending on the type of soil, the lay of soil, plants covering the soil and seasons.

(4) Observation of the grains of soil

Washing the grains of red clay and black soil and observe them through a binocular microstereoscope will show both types of soil contain beautiful, regularly formed crystals of minerals. They clearly show that they have originated from volcanic debris.

(5) Observation of drainage and retention of water

Watering generously red clay and black soil collected on several cliffs and observe how plants grow on them will result in more seeds germinating on the soil which drains better and more plants will survive for longer on the soil which holds water longer.

Soil is rather unattractive for pupils and students as an object of observation but can be surprised if it is introduced in an interesting way.

In order to introduce diverse aspects of soil, it is desirable that several modules be prepared based on children's developmental stages.

3. Environmental Education in the Upper Secondary Schools

Before the guidelines for EE were published, Science I in the 4th Course of Study (1978) contained some contents dealing with environmental problems related to Chemistry. However, only in few schools and by only some teachers were the environmental aspects taught resulting in almost no impact to students.

In the present course of study, all students are required to take one subject from any two of the following groups of subjects:

1. Integrated Science

2. Physics IA and IB
3. Chemistry IA and IB
4. Biology IA or IB
5. Earth Science IA or IB

The subject 'Chemistry IA' treats some contents related to the environment but only about more than 20 % of the students enrol in this subject. This implies that there was no impact because of very low enrolment.

Case studies in which students have more opportunities to learn about the environment must be developed. It may be suggested that these modules include at least the following chemistry contents which are believed to be necessary in the development of awareness of environmental protection among students:

1. Recycling of materials
2. Air, water and soil pollution
3. Global environmental problems like acid rain, green house effect and destruction of ozone layer

MALAYSIA

Pauziah Abd. Wahab

Malaysia is facing serious environmental problems. It is generally realised that the rapid economic and developmental growth in the country has given rise to a number of environmental problems. The rapid economic development has not only led to the destruction of certain types of flora and fauna but it has also threatened the livelihood of many a people. Environmental education for all is believed to be the best method to infuse a greater awareness of the seriousness of the problem among members of the public in general and school children in particular. Hence, various governmental and non-governmental bodies are actively involved in educating the public. These organisations have conducted or sponsored several formal and non-formal environmental education programmes. Through environmental education it is hoped that a balance between the environment and development could be established.

The Environmental Problems

Like other developed and developing countries in the world, Malaysia is also facing problems of environmental degradation, which left unchecked, will threaten the very well-being of her people. Some of the main environmental problems are:

i. deforestation due to forest land being cleared for agriculture, illegal logging and other developments. This has caused erosion, floods, siltation and also brought about adverse effect on wildlife.

ii. river pollution due to sewage waste, effluents from rubber factories and oil palm mills and industrial waste from manufacturing industries being channelled into the river.

iii. sea pollution caused by dumping of sludge and toxic wastes by foreign ships into the sea has affected marine life and the livelihood of the fishermen.

iv. air pollution due to rapid expansion of industries and the increase in the number of motor vehicles and to a lesser extent the open burning of solid wastes.

Environmental Education Concept

Environmental education is an educational process about, for and through the environment to upgrade the living standards of the people. The environment consists of all the physical, social, economic and political factors which are interrelated and affect the well-being of the people. Thus, environmental education is an action process which covers almost all subject areas. It aims at improving the quality of life of the people through knowledge about quality environment, with importance placed on sustainable development and through wise management of all natural resources.

Environmental Education at School Level

Towards the end of the 80s, the Ministry of Education Malaysia embarked on a National Environmental Education Programme to instil awareness among school children on the need for a sustainable environment. The Ministry decided that environmental education should not be taught as a separate subject but that elements in environmental education should be infused across the school curriculum. The environmental education programme consists of:

(a) Environmental Education Curriculum
(b) Strategy and Methods of Teaching and Learning
(c) Learning Stations for Environmental Education
(d) Environmental Education Materials
(e) Evaluation
(f) Training
(g) Monitoring

(a) Environmental Education Curriculum

The aim of environmental education in Malaysian school is to develop students to be more sensitive and observant of current environmental issues. It is hoped that through environmental education, they will acquire knowledge, skills, values and commitment to positively act on the issues either individually or as a group. The element of environmental education that need to be infused across the Integrated Primary School Curriculum (KBSR) and the Integrated Secondary School Curriculum (KSBM) are grouped into six headings:

i. God is the Creator of the Universe and all Creatures.
ii. The Earth, the Moon and the Universe.
iii. Non-Living things, Natural Resources and Energy.
iv. Living Things and their Environment.
v. Interaction between People and their Environment.
vi. The need for Proper Environment Management for Sustainable Development.

(b) Strategy and Methods of Teaching and Learning

It is recommended that the teaching of environmental education should be made fun, interesting and student-centred. Some of the teaching and learning methods include:

i. investigations and experiments
ii. discussions on current environmental issues
iii. competitions

iv. tracking and nature study
v. environmental camps
vi. seminars and lectures

(c) Learning Stations for Environmental Education

Teaching-learning stations are easily set up within a school compound and its immediate surroundings. Each station has its own learning modules, for various subjects in accordance with the 'across the curriculum' concept. Some examples of the stations are:

i. soils
ii. wash room/canteen
iii. fish pond

(d) Environmental Education Materials

Although rather limited, the Ministry of Education has produced some materials which can be used for environmental education at school level. These include Teacher's Guidebook on the Infusion of Environmental Education Elements Across the Primary and Secondary School Curriculum, and teaching-learning modules on environmental studies. Besides, school are also encouraged to produce their own materials and modules to suit their own environment.

Apart from the Ministry of Education, various other organisation including government and non-governmental bodies have also produced printed and non-printed materials such as posters, pictures, documents, brochures and teaching kits which may be used by schools to teach environmental education. An example is the World Wildlife Fund (WWF) Malaysia which has produced a book entitled 'Greeting the School'.

Presently, the Ministry of Education in collaboration with other governmental and non-governmental organisation is continuing its efforts to improve and increase the teaching learning materials on environmental education.

(e) Evaluation

A certain amount of evaluation is carried out by teachers to keep track on the progress of environmental education in schools. The methods engaged in evaluation include:

i. oral question
ii. observation
iii. written tests
iv. projects
v. other methods deemed fit

The result from these evaluation has helped teachers to assess the effectiveness in the teaching of environmental education in schools and actions are taken to rectify any shortcomings.

(f) Training

The Ministry of Education has established a National Environmental Education Training Centre (NEETC) at Institute Aminuddin Baki (IAB) at Gentling Highlands. The natural forest surrounding IAB has been used to conduct inservice teacher training programmes on environmental education. The NEETC is also used by schools, teacher training colleges and the local universities to conduct courses on environmental education for their staff.

Besides the Ministry of Education, other governmental and non-governmental organisations which are involved in conducting specialised training in environmental education for their staff, teachers and students are:

i. The Fisheries Department (aquaculture and marine life)
ii. The Forest Research Institute of Malaysia (identification of forest trees and useful products of the forests)
iii. United Motor Workers Malaysia (recycling of waste materials)
iv. WWF Malaysia and Malaysian Nature Society (conservation of the environment)

(g) Monitoring

The Ministry of Education has adopted a monitoring system which uses the following methods:

i. close monitoring is carried out by resource teachers and the school administrators
ii. resource teachers are required to submit a report on the progress of the environmental education programmes in their receptive schools
iii. State Education Department officers in-charge of Environmental Education, officers from the Curriculum Development Centre and form the Inspectorate Division make regular visit to schools to ensure the proper implementation of environmental education.

Environmental Education in Teacher Training Colleges

Until recently EE has been infused across the curriculum as part of the moral and values inculcating process. However in the current curriculum it is offered as a compulsory subject to be taken by all post-graduate pre-service teachers and the Diploma of Education students who enrolled in August this year.

Generally the EE programme for the pre-service teachers is similar to that introduced at school level. However the content of the curriculum is dealt with more deeply and widely. For the post-graduate students with degrees, the topic 'A Whole School Approach to Environmental

Education' has been added. The EE syllabus for the Diploma of Education students is still unknown as the subject will be taken later in their course.

Environmental Education for In-service Teachers.

From time to time training workshops are organised for in-service teachers by the Ministry of Education, probably in conjunction with the NGOs and other Ministries such as the Ministry of Culture, Science and Environment. Participants comprise of teachers of primary and secondary schools, teacher trainers, as well as heads of departments in administrative positions. Content of the workshops varies according to the aims and objectives of the training.

Achievements

Reports from schools and other education institutions that have already implemented environmental education show that students found the lessons to be interesting, meaningful and useful.

Trained resource teachers in environmental education have conducted in-service courses for other teachers.

Support and Co-operation

The Ministry of Education has received a lot of support and co-operation from various organizations. These supports include:

i. talks and workshops given by local universities, the Fisheries Department, the Forest Department as well as WWF Malaysia.

ii. provision of related printing materials.

iii. training workshops for resource teachers organised and sponsored by NGOs.

iv. donations from well-wishers, municipal councils and corporate bodies to support environmental projects in schools.

Conclusion

Environmental problems in Malaysia are mainly due to agricultural and rapid industrial development in the country. It cannot be denied that economic development will bring about prosperity to the people. At the same time, it is equally important to ensure that our environment remains a safe place for all to live in. Therefore, environmental education for all has been considered as the best method to infuse awareness of environmental problems and for the need to maintain a safe environment.

While at the education institutions, the Ministry of Education has incorporated environmental education into the curriculum resulting in a greater awareness of the environment among their members, the public must also be educated on the importance of maintaining a sustainable environment. Private organisations and individuals seem to show concern and have been very supportive in undertaking various environmental projects. Yet, there is more to be done. The general public should also be educated on environmental problems so that there would be a concerted effort by all to strive and maintain a balance between development and the environment.

NEW ZEALAND

Barry Law

Introduction

The NIER Seminar 'environmental education and teacher education in Asia and the Pacific' held in Tokyo Oct-Nov 1993 provided a rare opportunity to focus on some of the major issues that concern teacher educators across the region in addressing the pedagogy of environmental education in teacher education

The objectives of this seminar were:

1. to review the state of environmental education in the participating countries, including its curriculum and teaching-learning methodologies.
2. to review the state of teacher education in the participating countries and identify problems and issues in developing competencies required for teaching new learning areas such as environmental studies; and
3. to identify common problems and issues concerning the content and teaching-learning strategies of environmental education as well as needs and requirements in teacher education emerging from curriculum reforms.

New Zealand has begun to respond to the issues that arose from this seminar by firstly focusing on a holistic approach to environmental education across all education sector groups. The second response has been to support the development of the environmental education modules in the joint Griffith/ACEID projects 'Learning for a Sustainable Environment- Innovations in teacher education through Environmental Education' project. A third response has been to provide in-service training in environmental education using a mixture of resource material from the 'Learning for a Sustainable Environment' project and other sources.

1 Holistic approach to EE across all education sector groups

The delivery of environmental education in New Zealand has been constrained in both formal school education and in the wider community by a lack of direction and guidance. The major issues have focused on:

- what is environmental education?
- how should it be taught?
- who was responsible for delivering it?

The Ministry for the Environment and the Ministry of Education have become more pro-active in this area over the last four years and in 1995 both Ministries began to address the issue of guideline strategies for environmental education.

In January 1995 the Ministry of Education issued a contract to Robyn Baker (Wellington College of Education) and Barry Law (Christchurch College of Education) to write a guideline document for environmental education in the formal school curriculum. The final draft document is still under review by the Ministry of Education due to a concern over the specifications and the subsequent lack of emphasis on a bi-cultural approach to the environment. This is not the fault of the writers who followed the specifications as directed but one the Ministry must address with the developers of the original specifications. Funding has been put aside by the Ministry to deal with this issue and it is hoped that in 1997 we will see this document appear in schools.

The development of the draft 'Environmental Education Guidelines' document for schools did involve consultation with over one hundred different individuals and organisations. The document was developed in consultation with the Ministry for the Environment so that a common approach and direction for environmental education could be developed in this country.

The 'Ministry For The Environment' released the government's strategy for the environment in 1995. 'Environment 2010' provided a management strategy for dealing with the major issues and concerns that presently face New Zealand and urgently need to be addressed. The document outlines a six-part management agenda to "help achieve the vision of a 'clean, healthy and unique environment, sustaining nature and people's needs and aspirations'."

The six - part management agenda is:

1. Integrate environment, economic and social policy
2. Establish a coherent framework of law
3. Sharpen the policy tools
4. Build up the information base
5. **Promote education for the environment**
6. Involve people in decision making

Part five 'Promote education for the environment' outlines four proposals for action:

- **National approach**
- **Guidelines for schools**
- **Tertiary education programmes**
- **Education in the community**

This statement now provides a specific focus for teacher education institutions under point two 'Guidelines for schools' and point three 'Tertiary education programmes'. Teacher education institutions in the future will have to acknowledge the course components that address environmental education in their pre-service programmes and base these closely on the 'guidelines for schools' document.

The first proposal for action under promoting education for the environment is to develop a national strategy for environmental education across all sector groups. This document 'Learning to Care for our Environment - Perspectives on environmental education' has just been released as a discussion document and requires feedback submissions by 6 December 1996. This document provides a national focus for EE and emphasises a cooperative approach to 'informed participation in decision making by promoting environmental education throughout the community'.

The document clearly outlines six priorities for environmental education

- Environmental education in schools, particularly at primary and intermediate level. This should develop an awareness of the natural world and the interdependence of all life, and a sense of responsibility for the state of the environment.
- Environmental education in teacher training, both in in-service and pre-service, to ensure that teachers are competent in delivering environment education.

The other four priorities while not directly relating to formal schooling and teacher education will enhance the development of EE. The development of resources across all sector groups and the reinforcement of positive environmental messages in the workplace will continue to foster an appreciation and respect for the environment. A brief description of the four remaining priorities are listed below:

- Environmental education in business and professional education
- Environmental education in cleaner production concepts and techniques
- Environmental education in the community
- The establishment of an 'information clearing house'

Once the Ministry for the Environment has reviewed the feedback on this document and it is passed by Government, formal education authorities will then have a clear direction and a mandate to pursue the development of environmental education within teacher education and the school curriculum. This may provide the impetus for the Ministry of Education to complete the Environmental Education Guidelines for schools.

2 Developments in Teacher Education - The Griffith/ACEID Project 'Learning for a Sustainable Environment - Innovations in Teacher Education'

New Zealand has supported the development of this project and the trialing of three of the modules. This project has given impetus to teacher educators to review practices in both pre-service and in-service environmental education.

The major development in teacher education for environmental education has been the UNESCO sponsored seminar held at Craigieburn Forest Park in March 1996 where five of the six established Colleges of Education and Faculties of Teacher Education came together to review current practice.

The seminar was organised to examine the status of environmental education in teacher education within New Zealand and to promote the Asia/Pacific UNESCO project 'Learning for a Sustainable Environment - Innovation in Teacher Education'.

The seminar was seen as a possible pilot version of stage three of the 'Learning For a Sustainable Environment' project.

The objectives of the Craigieburn seminar were:

- to examine the barriers to the successful implementation of environmental education in teacher education in New Zealand
- to establish a network of 'critical friends' working in environmental education where materials, courses and programmes could be evaluated
- to foster closer links with Local Government and Regional Councils who are working in the area of environmental education
- to introduce participants to the Asia/Pacific environmental education modules and encourage them to modify, adapt, and introduce the modules or parts thereof, into either their pre-service or in-service programmes

to establish a series of recommendations to put forward to the Teacher Education Council.

A collaborative process was used to make the most effective use of the expertise of seminar participants. Input from all seminar participants was encouraged during the workshop. The purpose was to involve participants in open discussion and provide co-operative decision-making as a process for any final recommendations.

All the Colleges of Education that attended the seminar delivered a brief 15 minutes presentation outlining the status of environmental education in their College. The presentations covered both pre-service and in-service programmes from Early Childhood, Primary and Secondary.

Curriculum/Course issues

- in many cases environmental education is occurring by stealth
- there is a need for clarification and definitions of environmental education
- there is a difference between environmental science and environmental education
- optional/extension selected studies (personal interest can be catered for)

- while the environmental education strands are obvious to staff (sometimes only in hindsight), they are often not always obvious to students
- there is a need for practical experience **in** the environment - experiential education and EOTC experiences are seen as critical aspects of environmental education
- there is a need to develop positive values and attitudes among students towards the environment
- schools often rely on one dedicated environmental education teacher -> Environmental education programmes would collapse if they leave; schools need to develop a wider base of expertise and interest to make environmental education more prominent.
- environmental education is often issues based

Inter institutional issues:

- wider audience for courses
- some timetabling and staffing constraints
- individual lecturer interests important; modelling (appropriate pedagogy)
- pressures
  - programming
  - lack of official status

General Issues:

- environmental education needs a common definition – Guidelines for environmental education would be helpful
- lack of transferability of definitions
  - experiential models
  - methodologies
  - personal agendas
- infusing environmental education through core subjects or offering environmental education as a block course
- environmental education is a solution to providing an effective across curriculum approach especially in secondary schools.

Positive outcomes from the Craigieburn Environmental Education Seminar

The Auckland College of Education and The University of Waikato School of Education all have complete sets of the Modules and are working towards either modifying or integrating aspects of the modules into their pre-service programmes.

The seminar has also opened the links with the Regional Councils within New Zealand. Auckland Regional Council, Environment Waikato and the Christchurch Regional Council are now all working much more closely with teacher educators. It has also provided the Ministry for the Environment with information regarding the direction of EE within teacher education and some ideas on how this could be supported by government policy.

The development and recognition of EE in this country has certainly increased over the last two years and some of this can be attributed to our involvement in the 'Learning For A Sustainable Environment' project.

3 In-service and postgraduate training in Environmental Education

There has been an increase in demand for in-service work in environmental education as a direct result of the module trials. The Christchurch College of Education has run five 1-day courses separate from the module trials introducing the concepts of environmental education.

The College is also offering a paper in environmental education in a new Masters Degree in Teaching and Learning, which is starting in 1997. Lincoln University (on the outskirts of Christchurch) and the Christchurch College of Education are also currently exploring the option of developing a separate Masters Degree in Environmental Education for delivery in 1999. This would be a joint degree with both institutions offering an equal number of papers. This degree would provide both a research focus and a strong pedagogical base for someone who wished to develop and extend their competency skills in teaching environmental education. This degree would be open to all education sector groups and not limited to teachers working in the formal school system.

Summary Statement

New Zealand has set in place an environmental management agenda that has 'sustainable resource management' as its major outcome. To achieve this management agenda New Zealanders will have to look beyond the legislation aimed at stopping environmental degradation and look to pro-active ways in which they can bring about a change in how people view and use the earth's resources. Legislation like the New Zealand Resource Management Act is important and government has developed policy to ensure a reasonable level of environmental protection. However, this must be preceded with education that reflects a concern and develops a respect for the environment. Environmental education has yet to become a critical component in programmes of study across all education sector groups.

The Ministry For the Environment's draft policy document 'Learning to Care for our Environment' should provide direction and status for environmental education in all education sector groups.

Teacher educators are slowly recognising environmental education as an area that needs further development, and the introduction of the environmental education modules has provided Teacher Education institutions with a positive start. If the Colleges of Education can integrate the modules within pre-service teacher training New Zealanders may in time see a gradual change in attitudes towards the environment both in schools and in the wider community.

References

Christchurch College of Education, 1996: Environmental Education in Teacher Education. Final Report from UNESCO New Zealand seminar.

Ministry for the Environment, 1995: *Environment 2010 Strategy:* A Statement of the Government's Strategy on the Environment.

Ministry for the Environment, 1996: *Learning to Care for our Environment*: Perspectives on environmental education: a discussion document.

Ministry of Education, 1995: *Environmental Education Guidelines for Schools* DRAFT ONLY.

National Institute for Educational Research (NIER), 1993: *Environmental Education and Teacher Education in Asia and the Pacific.* Final Report on Regional Seminar.

PAKISTAN Farrah Parvaiz Saleh

The connotations of growth and development, heredity and environment, nature and nurture, character and conduct, are closely associated with wholesome development. One set of traits refer to the intrinsic characteristics and the other extrinsic. The product, not summation, of the two, directs and determines the magnitude of development. The developmental changes i.e. new roads, tall-buildings, public utilities etc. cannot painlessly produce changes in values. The real development is not only indicated, but also influenced by the `attitude' of the people and their level of commitment. A society plans its course of action for the change depending on what exists at the outset. Thus it would require that level and direction of commitment, both of the individuals, and the community. The developmental aspect and its influences on our environment are to be taken into consideration. National growth and development at the cost of environmental degradation may not be acceptable.

The growing need for creating awareness about the Environmental issues among the public at large and the students in particular does not need any emphasis. There is a growing need that the conscious citizen can play an effective role for saving the environment from degradation and destruction. This can only be possible if the people are knowledgeable about the environment, its related problems and are made aware with the solution to over-come these problems and are motivated to work in this regard.

Education has also played an important role in the building up a nation and a conscious society since it disseminate knowledge, provide necessary skills and helps informing certain attitudes. There is a need for an environmentally oriented education which can help to resolve the environmental issues. The best way to approach the educational system is to equip our teachers with the basic information and skills which can be forwarded and transferred to the young children who are to become the responsible citizens of tomorrow.

The Ministry of Education has taken the task of providing necessary information and awareness about the basic issues of environment and the role of an individual in improving and preserving the natural environment. The curricula and textbooks at the school level has been designed with a close link to the environment of the child who is to become a useful citizen and leader of tomorrow. Environment related issues/ topics have been incorporated in the school curricula and teaching learning material as well as in related activities to be carried out in school and out of school by the children.

There is a growing need that the teachers of today should be trained and equipped with the skills to suggest means and ways to ever come the environmental problems and create awareness among our students to realise their role as responsible citizens. One possible way of attracting teachers and providing them awareness to this growing menace is that a component on environmental education be included in the teachers training curriculum.

Teacher Guides for primary, middle and secondary level teachers, lesson units, a set of 20 visual chart, audio video cassette have been developed and distributed in some of the schools of the country. Orientation/training workshops have also been organised for a limited number of

Master Trainers/Teachers through out the country. A component of Environmental Education has been included in the curricula for the teacher education (PTC/CT and B.Ed) and units written on it. Under the directives of the Prime Minister Environmental Clubs are being established in the selected educational institutions through out the country. Teacher manuals and training material has been developed with the co-operation of National and International Agencies, besides the organisation of seminars, symposiums and workshops on Environmental Education. More work has been undertaken to provide awareness and information to our children and teachers in particular and for mass awareness in general so that the child of today can play an effective and useful role in the development of the nation in the times to come. They should contribute positively towards the environmental preservation and conservation:

A proposed network of teacher education programme is under active consideration and comprises of the following:-

- The Diploma in Education - Dip.Ed.-(10+3) OR (12+1): The standard Elementary teaching qualification.
- The Bachelor of education - B.Ed covering both Elementary and secondary; either (12+3) or (14+1/2).
- The Master of Education - M.Ed. (15+1-1/2).
- The Master of Arts in Education - M.A (Ed).- 14+2).
- Postgraduate Certificates, such as the Post Graduate Certificate in Teacher Education
- PGGTE; the Post Graduate Certificate in Educational Technology - PGCET; the Post Graduate Certificate in Educational /Management - PGCEM and Post Graduate Diplomas: and
- Higher degrees in education, such as the M.Phil. and the Ph.D.

This proposed ladder of professionalism (including bridging courses from, say Dip.Ed. to B.Ed) is presented diagrammatically. There then follows a rational and set of objectives for the overall approach, and justification and specific aims for each programme within it. Schemes of study are then presented.

This teacher education upgrading initiative, through which the schemes of study and draft curricula have evolved, is being supported through the Teacher Training Project (an Asian Development Bank activity). This Project aims at expanding teacher training capacity, increasing access to training opportunities for women, and in rural areas, improving the quality of teacher training programmes and strengthening teacher training planning providing necessary skills and management. As the Provincial Institutes of Teacher Education come on stream they will contribute significantly to co-ordinating and helping upgrade and expand teacher education.

This proposed Teacher Education Programmes for Primary and Secondary Schools teachers has recently been revised by the Ministry of Education. It now contains independent units on

Environmental Education. It enable and equips the teachers to develop skills to interpret the other courses with reference to Environmental education. Units on Environment clearly specify the following:-

Environmental Education for PTC:

Ecosystem as the basic unit of ecosphers; interaction and interdependence between living things and physical environment:

a) Atmosphere and vital role and natural cycles of its constituents; - Oxygen, Nitrogen, carbondiozide and Water.

b) Interdependence of plants, animals and human life and interaction with the ecosystem.

Energy flow from a single source and need for conservation of energy.

a) Energy flow. (b) nutrient cycles in an ecosystem.

Interference of population explosion with the ecosystem and environmental problems:

a) Environmental Problems: Environmental problems involved in industrialisation and intensification of agriculture, to meet human need for food, water, energy and minerals;

- Environmental pollution and soil degradation.
- Problems related to irrigation (water logging) damming water, use of fertilisers and pest control including DDT.
- Problems related to devegetation.
- Problems related to wild life.

b) Environmental Pollution Nature of Pollution and Causes.

I) Air Pollution. ii) Chemical Pollution.
iii) Water Pollution. iv) Noise Pollution.

Survival of mankind depends upon harmonising the human activities with the ecosystem processes.

Strategies for keeping environment clean and conserving energy.

Activities:

a) Field Trips, cleanliness week, tree plantation.

b) Preparation of material for environmental education.

c) Projects.
   i) Environmental Sanitation problems in the community.
   ii) Looking for patterns in Urban setting.
   iii) Analysis of newspaper report on environmental problems.

Environmental Education for C.T:

Understanding the Environment and the Providence:

Atmosphere and vital role of its constituents i.e. water vapours, Oxygen, nitrogen, Carbon, dioxide. Divine plan of protective quality of atmosphere. Independence and inter relatedness of living organisms and physical environment.

Environment problems caused by intensification of agriculture:

Problems of using fertilisers, pests and damming of water.

Soil loss:-

i) Causes

Environment problems caused by Industrialisation.

Environmental pollution and threat to life.

Air pollution: (heat, smoke, fumes, gases, vapours, hydrocarbons and particles, caused by vehicles, industries refuse agricultural burning).

Chemical pollution: (caused by fertiliser application and pest control including DDT). Water pollution: (caused by uncleanness and industry refuse).

Noise pollution: (caused by urbanisation/pollution growth).

Activities:

a) Group Activities: Field trips, cleanliness week, tree plantation.

b) Instruction for teachers, involving children to keep their environment clean.

c) Preparation of material on Environmental Education by teacher, using immediate environment.

At - Graduate Level (B.Ed) & (M.Ed).

Independent courses on Environmental Education in the form of Units have been developed and will be compulsory for all student teachers. This will enable and equip the teachers with the relevant skills and knowledge necessary to impart environmental education through the formal school system.

Through Non-Formal Education.

In a country where the literacy rate is approaching 35 percent and the participation rate is less than 55 percent with a very high drop out rate, the majority of the population of the relevant age group do not find an opportunity to enter and taken the advantages of the formal system of education. The majority of the population lies in rural areas which is devoid of the necessary educational facility. Women folk specially in the rural areas do not get a chance for formal education due to social culture and religious norms. Women have an important role to play as active and equal partners in development that entails ecological and social sustainability.

Programme through the non-formal endeavours may mobilise people to enhance their status, the community based participatory approach can enable people to contribute more effectively. Population and health issues are the entry points for organising and empowering people while education and communication are the keys to bring them further into the main stream specially contributing towards the betterment of environment.

Different government departments and Institutions, some autonomous bodies and a large number of non governmental organizations (NGO) are contributing towards fostering people's participation in decision that affect the environment. The most comprehensive avenue of non formal education in the country is Allama Iqbal Open University. The University has now acquired the services of an independent Television channel called as the Educational Channel (PTV_2). Mass media is also an effective and influential means for conveying the important message. The University offers courses in a variety of subjects at all level of education using Television, Radio, extension teachers, regional centre, and courses through mail. The package developed by the open university in areas like population, health, nutrition and women and children care have proved to be successful. Most of the students of the courses are already working in certain fields in rural and urban areas The focus of these courses are relevant to everyday life. This can make the integration of a sustainable development focus easier in Open University courses. Similarly, the courses initiated for women by the open university are bearing fruit. Programmes on literacy and extension programmes in area of agriculture, poultry farming, livestock etc. have provided more insight into the areas together with its impact on environment. They have helped the people to realise and become sensitive to the problems of environment and the role which the individual and society can play in the participation and decision making that effect our environment.

The enthusiastic participation of so many highly competent university faculty, senior national and provincial educational managers and planners, and other educationalists and strong political commitment of the government in this initiative is extremely encouraging.

TASK FORCE for environmental education and mass awareness:

To co-ordinate, monitor and make plans for EE and Mass Awareness

Members of the task force include the following:

An official from the Ministry For Health

An official from the Ministry For Education

An official from the Ministry For Population

An official from the Ministry For Environment

An official from the Ministry For Pakistan television

IUCN, WWF, NGOs and individuals.

Development of EE curricula for classes, from Class I to Class Ten in collaboration with UNESCO.

EE at Universities level:

Institute For Environmental Sciences,	Quaid-I- Azam University, Islamabad.
Department of EE,	Peshawar University, Peshawar.
Environment Sciences,	Engineering University, Lahore.
Green Action Programme,	Allama Iqbal Open University, Islamabad.

Environmental Clubs In Secondary Schools of the Govt

These clubs are in all the four provinces of Pakistan. These have eight member committee and teacher is a co-ordinator and in charge of the activities of the club.

National Centre of Excellence for Teacher Training in EE:

Target Group:
Training / Retraining teacher trainers,
Practising Teachers,
Decision Makers,
Education Planners,
Administrators,
Media people and NGOs
Objectives and Aims:
To develop teaching /learning material,
To develop workshop /seminar and training programme,
To revise existing materials,
To organise mobile workshops,
To print periodical magazine,
To work as a Resource Centre,

PHILIPPINES

Angelina P. Galang

Since the NIER workshop in Tokyo in 1993, there have been significant developments in environmental education (EE) in the Philippines. It has been realised that for any turnaround in the continued deterioration of the environment, the minds and heart of the people must tune in to a common vision of sustainable development. Thus EE must be of the highest priority.

A. EE for Teacher Education

1. Programmes

The Department of Education, Culture and Sports started in 1993 a special program whereby public school teachers are given scholarships for a Master of Arts in Education major in EE. Since EE had not been a feature of teacher training, this programme was expected to contribute greatly to the spread of environmental concern and behaviour.

The teachers were sent to Miriam College with whom the DECS around a special Memorandum of Agreement. The arrangement started in November, 1993 with 70 Grade School and High School teachers coming from the National Capital Region and 2 contiguous areas, Region 3 and 4. These teachers are in different areas in recognition of the fact that EE can and must pervade all disciplines. Some of these areas are natural science, social science, health and home economics. The programme is in an evaluation phase, prior to extension to other regions. See Appendix 1 for the curriculum of MA in Education major in EE.

The implementation of the National Environmental Education Action Plan (NEEAP) has started. The NEEAP is the third phase of a project funded by the Asian Development Bank which started in 1992. It aims to spread EE nationwide in a systematic and unified manner through the formal and non-formal approaches. It will be implemented by the DECS and the Department of Environment and Natural Resources. The first and second phases involved the review of the status of EE in the country and the formulation of NEEAP respectively.

The initial focus of the third phase is the curriculum. It is being worked on by a team composed of consultants in basic, tertiary, teacher, technical/vocational and non-formal education as well as specialists in the production of print and audio-visual supplementary materials. The expected output is a framework that will guide EE nationwide through its articulated philosophy, vision and mission statement, scope, strategies and modes of evaluation. Some exemplar lessons, posters and videos will also be produced.

The matrices and teacher's modules that Miriam-P.E.A.C.E. has worked on since 1990 to result in an EE continuum from Grade 1 to 4th year high school has recently been published. The materials are guides for teachers in 2 subjects in the Elementary level: Science and Social Studies and 4 in the High School level: Science, Social Studies, Health and Value Education. The strategy is the infusion of environmental concepts in these traditional disciplines at the respective curriculum level and subject using the appropriate depth and mode of delivery. Prior to publications these materials were field tested, evaluated by the users, revised and validated in a series of workshops by the Department of Education, Culture and Sports.

The continuum identified entry points for environmental concepts in the curriculum. A matrix of topic against environmental principles, knowledge, skills and values was formulated. A summary of these topics and the strategy by which each is given the environmental perspective has been prepared.

Teacher training seminars and workshops are continuously being given by private and governmental institutions. Those with regular programs are the Environmental Education Network of the Philippines, University of the Philippines Institute of Science and Math Education, the Institute of Environmental Science and Management at U.P., Los Banos, Miriam College, Polytechnic Institute of the Philippines, and the teacher organizations, e.g. Biology and Chemistry Teachers' Association.

The various environmental NGOs, although focused on particular issues, usually include teachers and thus, teacher-training in their advocacy programs. They have developed many creative approaches focused especially on rural folk, e.g. comic books, plays, pantomime.

2. Curriculum

Environmental education is delivered in the general tertiary level curriculum either as infused in the traditional physical, biological and social sciences and other disciplines and/or as an integrated natural science course.

Flowing from the nature of the respective courses, the following allocation of topics has been suggested:

Biology

- Theory/concepts: Ecosystems - examples, components, functions, matter and energy flows; Ecological relationships within and among ecosystems; Biodiversity
- Issues: Organic Farming; Illegal logging; Illegal fishing

Chemistry

- Theory/concepts: Materials cycles
- Issues: Pollution - types, causes, effects, possible solutions; Ozone layer depletion; Synthetic chemicals and their environmental impact; Solid Waste Management.

Physics

- Theory/concepts: Transport of materials through wind and water systems.
- Issues: Energy; Global warming; Sources of electricity, advantages and disadvantages of each.

Economics

- Theory/concepts: Finiteness of resources; Economic systems and their environmental impact.
- Issues: Environmental audit; Environmental degradation as externalities; Business responsibility to the environment; Environmental implications of international trade; Business implications of environmental standards

Sociology

- Theory/concepts: Modernisation; Population/demography; Culture; Social systems.
- Issue: Impact on the environment of the above

Ethics

- Theory/concept: Responsibility of man towards others.
- Issues: Modern attitudes and behaviour toward the environment; Intra- and intergeneration equity

The following are emphasised as essential features of environmental education.

a) Environmental education is about, for, in and through the environment.

b) Environmental education must cover both in- and out-of -classroom experiences.

c) There are core messages that weave through environmental issues:

  - Interdependence
  - Balance of nature
  - Biodiversity
  - Change materials cycles
  - Finiteness
  - Stewardship

When an integrated Natural Science course(s) takes the place of disciplinal offerings, environmental education should be given along the lines of the core messages. This is likewise the strategy suggested for non-formal training.

At present, all the teacher-training institutions have plans or are in the process of giving environmental education as a separate course or through syllabi revision of existing subjects. Environmental education is part of the curriculum in most graduate education degree programs, e.g. Educational Management, Values Education. A consortium of institutions offering M.A. Values Education is currently developing a course on Environmental Ethics.

3. *Teacher capability*

An extensive survey of basic education teachers reveal the need for more widespread training. While, as mentioned earlier, environmental issues are integrated into the natural and social sciences, there is need for appreciation and the ability to impart holistic environmental concepts.

Environmental education pedagogy needs to be strengthened. Teaching methods generally fall under the cognitive and psychomotor domains, Values and Ethics need to be emphasised. Most activities are still teacher-centred with the lecture method predominant. Student activities are still the traditional problem-solving activities and science experiments using standard cookbook manuals. Much still has to be done to promote student innovation.

B. EE for other groups

1. Environmental specialists

Since 1993, q good number of schools have begun offering degrees in environmental studies/science/management/planning/education. See Appendix 2.

2. Other professions

The EENP has initiated a program to review the curricula of various professions and to effect needed reforms. For this effort it has linked with professional associations in the fields of agriculture, business, engineering, law medicine and planning. It recently held the First Philippine Congress in Tertiary Education with the theme "Greening the Professions".

3. Government officials

The Development Academy of the Philippines, tasked with the growth and development of government officials, has maintained a diploma course on Environmental management which it started in 1992. This course runs for one week.

4. Grassroots sectors

Farmers and fisherfolk have been influenced by new technologies which, meant to maximise return for their efforts, have often been counterproductive. Thus, farmers and fisherfolk need the theoretical understanding of their environment. Non-formal materials, mainly print have been produced for appropriate and ecological technology for these sectors. Trainings have been given by schools, NGOs and the government.

5. The public

Several radio programs, some weekly, some daily have been focused on environmental education. A new organisation, the Environmental Broadcasters Circle, was recently started. Newspapers have increasingly covered environmental issues, both negative and positive developments. The Association of rural Broadcasters has been providing training on the air for farmers. The Communicators' League for Environmental Action and Reform has been an active organisation of journalists.

C. The situation: Gains and Setback

The increasing environmental consciousness and concern is manifested in school programs, especially in solid waste management. While traditionally newspapers and certain types of bottles have been recycled, the business sector and NGOs have delved into recycling more and more types, e.g. styroform, any and all make of paper, even candy wrappers. Segregation is done according to a) nature of waste, i.e. biodegradable and non-biodegradable or dry and wet, b) the destination of the waste, i.e. factory, feed for animals, compost heap or municipality dumpsite. The factory recyclables may be further subdivided into glass, paper, rubber, metal, etc. Also, a lot of composting is being done. Most schools have student environmental organizations which get involved in the "green", "brown" or "blue" issues including the pertinent social, legal, political and economic factors.

While a lot of effort is being exerted by concerned individuals and institutions, environmental problems are still very much with us and crises erupt now and then. Illegal logging and fishing still goes on though reportedly these activities have decreased. Vehicular pollution is getting worse. Land use conversion from agriculture to other uses is an issue that needs urgent resolution. Two disasters struck recently. A tunnel of Marcopper, a big mining company collapsed and huge volumes of mine tailings burst out into a major river, rendering it unfit for any human use, even navigation. A giant fishkill occurred in Manila Bay. Thirty tons of dead fish were seen floating in its waters one day. It is suspected to have been caused by cyanide released from one of the industries along the Pasig River leading to the Bay. With the Philippines looking to further industrialisation in order to be able to improve its economy, the danger and fear of more environmental destruction has solid bases.

One big victory, however, was realised some months ago. A major development project intended to be launched in Bolinao, Pangasinan was blocked. The project involved among others a cement plant and the upstream and downstream activities associated with it. The project would have adversely affected a valuable marine reserve. Through the concerted efforts of the Marine Institute of the University of the Philippines, NGOs and the residents and a thorough evaluation of the project's Environmental Impact Assessment by an enlightened consultants' team, the project was denied an Environmental Compliance Certificate. This would not have been possible if the government had not correctly read the pulse of the public. Environmental education had taken hold.

REPUBLIC OF KOREA

Don-Hyung Choi

I. Development of Environmental Education

The history of development of school environmental education in Korea can be divided into 3 stages periodically - *the beginning period(before 1980), the formative period(1981 - 1991) and the settlement period(after 1992)* - as follows.

1. The Beginning Period (before 1980)

Environmental education had been stretched out with environmental protection activities of many civilian environmental organizations. Along this world wide movement, they started to mention environmental education in Korea because many problems of environmental disruption and pollution were occurred during this period in Korea, too, due to the *3rd Five Year Economic Development Plan* which had been promoted since the beginning of 1970s. In spite of the reality, environmental education in Korea couldn't go over the national publicity level without any discrimination with the protection movement of natural environment because Korean policy was focused on the economic development and the increase of income at that time.

In the midst of it, *Korean Educational Development Institute(KEDI)* contributed to inform the educational groups of the importance of environmental education, holding '*Workshop on Environmental Education*' and carrying out fundamental researches. In late 1977, the first major environmental statute, the *Environmental Preservation Act* was enacted, and in 1980, the *Environment Administration* was established.

2. The Formative Period (1981-1991)

As the nation's economy grew massively during the 1980s and as people's awareness of environmental protection grew with the democratic reforms of 1987, it became obvious that Korea's environmental laws and institutions needed a major reform. The result was the enactment of series of environmental statutes in 1990 and 1991, and the establishment of the *Ministry of Environment* replacing the Environment Administration in 1990. The Korean government has applied a number of principles and mechanisms to protect the environment and to realise sustainable development. Environmental impact assessment and various mechanisms based on the principle of "*Polluters Pay Principle*" are the major policy tools of the government to bring about sustainable development. In this period, Korean people became to recognise the importance of environmental education in respect of education and emphasised environmental education explicitly in school curriculum. The phrase of *"......recommend to operate environmental education in the overall educational activities......"* was included in the '*Guidelines*' for the 4th Curriculum which was reformed in 1981 and contents and activities concerning with environmental education were started to be taught in science and social studies subjects. In addition to that, environmental education became more emphasised with stipulations of *"...... for all the people to occupy sound lots to enjoy happy lives in pleasant environment ......"* and *"...... respecting humans and valuing nature ......"* in *'Orientation for Curricular Structure'* of the 5th Curriculum which was reformed in 1987. Realising the importance of environmental education for students, the Ministry of Environment designated *Environmental Conservation Model Schools* and has operated them with co-operation of regional boards of education nation-wide since 1985. The representative organizations which put efforts for the development of environmental education in Korea during this period were the *KEDI* and the *Korean Society for Environmental Education.* KEDI newly established the *Environmental Education Research Department* in January of 1991 and played an important role for ensuring substantiality of the school environmental education. Especially, the Environmental Education Research Department played a crucial role in establishing *'Environment'* subjects in middle school and high school systems as independent subjects under the 6th Curriculum.

3. The Settlement Period (after 1992)

Korean Government announced *'Nation's Statement for Environmental Conservation'* in commemoration of the 20th *'World Environmental Day'* on the 5th of June in 1992. And the environmental education and environmental education research became more activated by which *'Environment'* became an independent subject in the 6th Curriculum and organized in school educational system. *'Environment'* (34-68 hours per year for each grade in 1-3) and *'Environmental Science'* (4 units, 1 unit as of 16 hours per semester) were newly established in middle and high school respectively according to the 6th Curriculum. The formation of environment subject in this way is very significant in the meaning that environmental education which has been developed passing through the beginning and the formative periods became institutionalized to be executed firmly in stable conditions.

II. Case Studies on Teacher Education for Environmental Education in Korea

I have ever made an alternative plan of in-service teacher training and teacher educational program for teachers who would commit to environment subject when I presented the research result of "*Teacher Education and Training for the Substantiation of School Environmental Education*" (1992).

1. Summary of the Research Result Relating to Teacher Training for Environmental Education

- There were no regional boards of education which put general training about 60 hours long for environmental education for one year recently, and just some boards of education(5.5%) put special presentations 1-2 hours long.
- 90.4% responded the training for certificates(180 hours or long) and the general training(about 60 hours or more) executed by authorized institutions

were more appropriate as an in-service teacher training method for environmental education than self training or each school training.

- 82.9% responded concentrated training during vacation was more appropriate.
- 26.9% for the Ministry of Environment and the related institutions pertaining to teacher training programs and 25.9% for regional boards of education responded as suitable institutions to host/manage training courses.
- 51.6% for researchers concerning environmental education and 39.4% for professors of the department of environmental science responded as appropriate lecturers for teacher training programs.
- 38.5% for science teachers, 20.7% for social studies teachers, 15.3% for industry/domestic economics teachers in middle school and 24.5% for earth science teachers, 19.3% for biology teachers in high school responded as appropriate teachers to be in charge of environment subject at schools.
- Only 6.3% of respondents took environmental education training course 1-2 hour long within recent 5 years, and 22.4% of them evaluated it as useful and 22.9% as very useful.
- 26.3%, 18.3%, and 29.2% pointed out insufficiency of program contents and materials, shortage of training time, and lecture-centered strategy respectively as weak points in the training programs.
- Most of respondents, 98.2%, were willing to participate in environmental education training if provided.
- Over fifty, 68.5%, of respondents wanted the consciousness /sense of value/attitude of the environmental conservation to be emphasized in program contents.
- 59.5% wanted field trip/material collection type as a training method.

2. Summary of Research Result Relating to Teacher Education for Environmental Education

- None of universities in charge of teacher education set courses concerning environmental education as requirements in the educational curricula.
- Almost all of respondents, 94.9%, thought the establishment of courses concerning environmental education were necessary in the curricula of teachers colleges and colleges of education.
- 57.7% and 27.4% thought courses concerning environmental education should be set as required and elective ones respectively in universities in charge of teacher education for all the students.
- 76.8% thought environmental conservation consciousness/ sense of value/attitude should be emphasized as contents of the course.

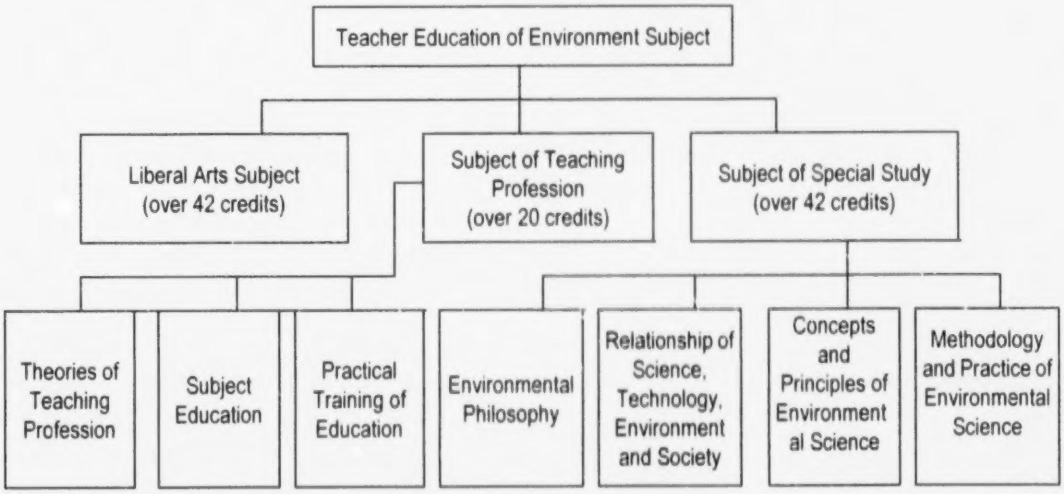
3. Summary of Proposal of Teacher Education and In-service Training for Insuring Substantiality of School Environmental Education

First, teachers to be in charge of '*Environment*' newly established in middle school and '*Environmental Science*' in high school should be cultivated systematically. Ideally, environment teachers should be cultivated and produced in stability from departments of environmental education in universities in charge of cultivating secondary school teachers, and courses for minoring in environmental education should be established and operated at the same time. Model program of '*Environmental Education Department*' proposed in this study is shown as following figure.

Secondly, the general training or the qualifying training course during the vacation should be offered to science teachers and social studies teachers for certifying qualification of minor-ship in environment subjects, *Environment* and *Environmental Science*, newly established in the aspect of teacher supply in short term period. And the quality of the training principally focusing upon that of training type, method and trainer selection should be improved and numbers of training courses and subjects should be increased which are restricted at present.

Thirdly, elements concerning environmental education such as the necessity of environmental education and the subject contents should be included and taught in all of the teacher training programs.

Fourth, the establishment of standard curriculum of environment teacher education and the development and dissemination of qualified teaching materials to be used for environment teacher education should be promoted. Especially visualized teaching - learning materials and the equipment for experiments and practices should be supplied and kept regionally in local boards of education to be used easily for teachers.


Teacher Education of Environment Subject
Liberal Arts Subject (over 42 credits)
Subject of Teaching Profession (over 20 credits)
Subject of Special Study (over 42 credits)
Theories of Teaching Profession
Subject Education
Practical Training of Education
Environmental Philosophy
Relationship of Science, Technology, Environment and Society
Concepts and Principles of Environmental Science
Methodology and Practice of Environmental Science

[FIGURE] *Model Program of Environmental Education Department*

Lastly, supervisory work concerning environmental education should be done systematically with institutional devices to improve professionality of teaching professional vocation at the level of each local board of education. Stipulations concerning environmental education should be inserted explicitly into the guide of supervisory work. In accordance with it, if with appropriate supervisory work, the effect of environmental education will be increased overcoming difficulties of the present.

III. Current Status of Teacher Training and Education for Environmental Education

The following describes current status of teacher education for environmental education in Korea since NIER seminar held at Tokyo in 1993.

First, 'Environment' was added to the indicative subjects on teacher's license for secondary school teachers since 1994. Accordingly, institutional establishment of Departments of Environmental Education became possible to produce environment teachers from universities in charge of teacher education or to put in-service teacher training course.

Secondly, the training for environment teachers with special certificates for the present who would be in charge of Environment in middle school and *Environmental Science* in high school in the 6th Curriculum which would be enforced from 1995 has been started since 1994 summer vacation.

Thirdly, Departments of Environmental Education were established in 3 universities for educating teachers who would be in charge of environment subjects in secondary schools and 20 students entered each universities in 1996. They will be able to teach Environment subjects in secondary schools with teachers' certificate of Environment subject after completing undergraduate courses with over 42 credits of special studies concerning environmental education.

Fourth, chief teachers of environment subject in all the schools nation-wide nominated since 1995 have been leading environmental education in Korea to be actually practical for students and disseminating the importance of environmental education to general teachers.

Fifthly, minor-ship of environment subject was put in force since 1996. Students who took over 21 credits of subjects concerning environmental education can get teaching certificate of minor-ship in environment.

Lastly, a number of 'Research Association of Environment Teachers' were organised in local scale, which were naturally come out, and are doing many activities such as training of its own for environmental education, development and dissemination of teaching materials for environmental education, giving camping and field-trip experiences for environmental education.

IV. Concluding Remarks

The most urgent matters to accomplish intended educational purpose for the settlement of environmental education as one of school systems are those of the teacher education and the in-service teacher training. In reflection of it, liberal arts subjects, subjects of teaching profession and subjects of special studies, which are necessary to the teachers in charge of environment as teaching professionals, should be organized in balance in the programs of teacher education and training for environmental education. In detail, there should be included in contents of curricula such abilities as basic knowledge in ecology and the ability to investigate and evaluate environmental problems in the aspect of contents of environmental education as well as the background knowledge of educational philosophy and educational psychology, basic abilities of teaching-learning methodology and the development/ selection/utilization of teaching materials. In Korea, it is anticipated that many teachers with teaching certificate of major-ship in *Environment* subjects from March of 2000 will be produced from formal universities and they will contribute greatly to the enhancement of the quality of environmental education at school level in Korea.

THAILAND

Lawan W. and Wilawan C.

Thailand has been facing an environmental crisis in the same way as many other developing countries which are rapidly developing their national economies to create a better standard of life for people. But they have neglected to maintain and preserve the natural resources and environment. The over use of natural resources has resulted in degradation , deforestation, toxication and pollution which critically contaminates people's quality of life. The movement and efforts of the government and private organisations have been put into action to solve these problems by readjusting the management and control mechanisms along with development, to sustain the environment and the natural resources. Environmental education has been integrated into both formal and non-formal educational programs since 1977, but the matter has not been taken seriously, until the last decade. Increasing interest and actions have been taken to respond to the needs of environmental preservation, i.e. the launch of the Ministry of Education Master Plan for Environmental Education, certain universities offer a master's degree and doctoral degree programs in environmental education to train teachers and environmental educators to promote activities in their schools and communities, the National Plan for Environmental Education has been drawn and to be approved by the government, additionally various organisations have taken on their share to educate people in several aspects too. However, those past and present activities seem to be insufficient and ineffective since the environmental problems have not reduced in size but have increased and have caused a deterioration in society as a whole. It is evident, then, that lack of knowledge about environmental problems is responsible. Both formal and non-formal education should revise their programs and activities in environmental education so as to attain their goals in helping the youth of today develop the awareness and conscience to conserve their environment. This effort should be made continually on a long term basis for the sake of the sustainable environment and also the growth of the country's economy at the same time.

The importance of environmental education as an essential means to develop among the Thai youth both in and out of school, environmental awareness, has been realised. An effective environmental education program depends on the teachers' knowledge and abilities to conduct instructional activities, utilise instructional media and evaluate the students' knowledge and achievement, as well as, their attitude and awareness. These processes will develop their thinking process and behaviours to address environmental problem. Competent teachers in environmental education normally are products of good teacher education program addressing environmental education. Even though environmental education has already been formally integrated in school curriculum since 1977, it is only evident in science, social studies and health education. The concept of across curriculum environmental education had just been emphasised lately, and is still a limited practice. Most teachers do not feel it is necessary to integrate environmental education in their subjects, believing it to be the responsibility of science, social studies, and health education teachers only. The need for readjustment in teacher education has been identified as well as the role of teachers of all subjects across the curriculum to address environmental education in their teaching. In fact, there has already been environmental education in teacher education, but without clear principles and objectives in practice. However, there are various agencies, governmental and non-governmental, who conduct teacher education and training for environmental education in Thailand, both formal and non-formal. Those who do the task of teacher education and environmental education can be roughly grouped into three: Schools of Education of the universities under the Ministry of University Affairs, Those of Rajapat Institutes (former teachers colleges), and the supervisory units under the Ministry of Education, and the NGOs. Teachers education and environmental education undertaken by each group since 1993 are described in the following three sections.

1. Teacher education and environmental education by the Schools of Education under the Ministry of University Affairs:

There are 17 Schools of Education under the Ministry of University Affairs most of them educate teachers for kindergarten, elementary and secondary schools while a smaller number educate special teachers like instructors of mechanics, technicians, etc. Courses on environmental education have been offered both as required and elective courses in general education of the teacher education program. The success of the teaching depends on the instructor's background and practice. Only those who have already been oriented to environmental education will be able to encourage the student consider the issue of environmental education and have them develop their thinking and decision-making skills, while the remainder concentrate only on the context coverage of the subject. Only a few institutions offer environmental education as an area of study or specialisation at graduate level. There are more courses in environmental education and integration of environmental education in various courses in degrees programs in science, social studies, and health education. Study programs for environmental education are offered at the higher degree level from graduate diplomas to doctorate studies. At the present time there are only a few colleges of education offering Master's degree program of study in environmental education and only two schools of education offering programs of study in environmental education leading to a doctoral degree, Mahidol University and Khonkan University.

The across curriculum environmental education in schools is widely accepted. This will lead to a revision of teacher education curriculum as well as the management in schools. There will be a need for environmental education co-ordinators in every school who will teaching the learning of environmental education through all subjects. The Minister of Science, Technology and Environment has submitted the National Plan for Environmental Education to be approved for the government by the fiscal year of 1997. The Ministry of Education has also recently called for co-operation from various sectors in setting up learning outcomes of every school subject to be relevant to the 8th National Plan for Economic and Social Development emphasising the promotion of the development of human resource quality. Environmental Education has also been analysed and learning outcomes were identified for environmental education as a separate discipline. This might be an indication for more preparation of environmental educators and teachers in order to cope with these two plans.

For the in-service teachers, these schools of education often offer short training courses in environmental education during summer or between school breaks as do many governmental organisations. This help to improve the teachers' teaching potentials.

There is an emerging request for more effective instructional materials, especially the use of prototype instructional packages in environmental education for teachers, in order to meet the need for more environmental education for teacher education is very obvious. This is due to the fact that there are more than 600,000 in-service teachers. It is not possible to get all of them into the training workshop owing to lack of time and budget. The prototype instructional packages will help in-service teachers learn how to teach environmental education by themselves. This is an effective way to train large numbers of teachers. So many sectors are now paying more attention to this kind of teacher education in environmental education. More co-operation in teacher training and education in environmental education are being sought. The Centre for Environmental and Global Education, Chulalongkorn University has organised several workshops for teachers to co-operatively develop instructional packages to be used in schools, a workshop on environmental education teaching and learning strategies, the next workshop will be on "Innovations and Changes in Teacher Education : A Role for Environmental Education" for teacher educators throughout the country in December 2-4, 1996.

2 Teacher Education and Environmental Education under the Ministry of Education

Due to the policy changes, the Ministry of Education (MOE) has put more efforts into Environmental Education at all levels. This Master Plan on Environmental Education identifies the improvement of environmental problems through education rather than technical solutions. The plan aims for sustainable development. The main task is to incorporate environmental education materials into the curriculum at all levels. Production of Environmental Education learning materials, introduction of new teaching methods, the assessment systems, and administration and management important new dimensions and approaches to environmental education that will instill in the students environmental awareness, attitudes and ethical values. The aim will be to develop responsible adults taking part in the general public to develop a sustainable environment. The students will acquire the capability of self-understanding, and the understanding of others - which encourages a less self-centred mindset.

2-1 Environmental Education of Elementary and Secondary Education Levels

The Department of Curriculum and Instruction (DCI) is responsible for elementary and secondary school curriculum development which is to be implemented by the office of Primary Education Commission (ONPEC) and the Department of Secondary Education. As mentioned in the 1993 country report of NIER, Environmental Education has already been integrated in the National Curriculum at both levels. There are now new developments added up to the curriculum: (1) the setting up of Environmental Education learning outcomes and (2) The proposed project on energy conservation education.

The setting up of Environmental Education learning outcomes is to be used as teachers' guidelines. The energy conservation education project has been initiated and funded by the National Authority of Energy in corporation with the MOE and the Thai Environmental

Institute (TEI). The project will cover the curriculum development, instructional materials production, evaluation devices, and teacher training.

2-2. Teacher Education and Environmental Education

Teacher education under the Ministry of Education (MOE) consists of the Faculty of Education of the 36 Rajabhat Institutes. However, the Rajabhat Institutes Act of 1995 has bought changes to the institute organisational structure, administration and autonomy. Each institute may now offer programs leading to Bachelor's degree, Master's degrees and Doctoral degrees and other diplomas. The management structure and system of ORIC are organised to fulfil the broader goals and missions on teaching, scholarship and research matters. Each Rajabhat Institute has its own president who takes responsibility for the governance of the institution.

Rajabhat Institutes are assigned to be the educational centres for rural development. In the 1996 budget, the government arranged to establish five more Rajabhat Institute campuses besides the existing 36 Rajabhat Institutes in order to meet the demand of the local communities and the country. Their goal is to have one Rajabhat Institute at each province. Their functions have been increased and adjusted into a total of six as follows:

1. Provision of educational programs at all degree levels.
2. Conducting research for rural development.
3. Preservation and promotion of arts and culture.
4. Promotion of the academic and professional status of teachers and educational personnel.
5. Use and updating of advanced technology to enhance instruction and improve academic efficiency.
6. Provision of academic services to the community.

Besides offering courses in general Environmental Education within various degree programs and in-service programs, there are other projects emerging in Environmental Education worth mentioning in this report as follows:

(1) The Environmental Education Centre at Pranakorn Rajaphat Institute, ORIC.

It has been establishing in 1988. Its objectives are to impart environmental awareness and knowledge to instil positive attitudes and personal responsibility of environmental conservation, and to develop skills in conducting Environmental Education activities for students, teachers, teacher educators, and community leaders. Its goals are research and development in Environmental Education, production of instructional materials in Environmental Education, and training education personnel and teachers both in-service and pre-service training.

(2) The Project of Environmental Conservation and Development, ORIC.

The prime objective of this project is to promote human potential for the development of the social and natural environments supporting a sustainable economy, society, and a way of life. The key activities of the project can be elaborated as follows:

First, setting up a database of local natural resources and environment. Second, conducting research on local natural resources and environment. Third, organising and conducting seminar/conferences on the conservation and development of natural resources and environment. Fourth, campaigning for conservation and monitoring natural resources and environment. Fifth, local reforestation, and finally, setting up the centre for exhibition on natural resources, environmental and energy conservation.

(3) The project of establishing the Faculty of Human Development and Environmental Technology.

This project has been developing since since 1992. At present, there are 10 out of 36 Rajaphat Institute offering B. Sc. in Environmental Science, with a total of approximately 450 students in five areas, for example, General Science, Environmental Management, and Environmental Technology. It is expected that by the end of the Eighth Educational Plan every Rajaphat Institute will be able to establish the Faculty of Human Development and Environmental Technology.

Non-governmental Organizations

In-service teacher education and training in both content area of environmental studies and teaching methodology are also provided by various NGO's, e.g.: The Green World Foundation, The Magic Eyes Association, etc.

VIETNAM

Hoãng Đuc Nhuân and Nguyêñ Van Khang

Although the great success of greening programme, 91 - 95 in school network the situation of environment in over country was still not improved and, on the contrary, it becomes worse from day to day. There are many reasons but might be from the following three main causes:

1. The high growth rate of population since 1975 to 1993 (over 2.3%)
2. The quick process of urbanisation (for example, in 1975 there were one million and a half in Hanoi and three million in Ho Chi Minh City and now in 1995 there are already three million in Hanoi and five million in Ho Chi Minh City).
3. The process of industrialisation over the whole country.

They provoked big challenges in all aspects to our environment:

1) a fast deforestation (both jungle and mangrove); 2) water pollution; 3) food pollution; 4) air pollution; 5) soil pollution; 6) noise pollution; 7) energy limitation; 8) waste.

Besides direct measures to improve the environment it was enhanced environmental education and experimented to include it systematically into our curriculum from pre-school education to post-graduate education and different/various activities that are relate to environmental education.

Review of Curriculum

A curriculum "Making acquaintance with surrounding nature" for big children-kindergartens has been set up to establish love on nature and establish habitude of children in nature and for nature.

Primary education level in considered as level of the foundation of personality and first impact of man. Environmental Education is integrated into relevant subjects, such as "Exploring Nature and Society", "Health Education" and "Moral Education".

At lower secondary education level Environmental Education is continued to be integrated into curriculum of "Biology", "Geography" and "Civic Education". Moreover, there is a separate chapter at the end of Biology 8. The first basic concepts of Ecology and Environment are provided systematically.

At upper secondary education level the personality should be completed and the full human impact is also prepared. Environmental Education is also continued integrated into "Biology", "Geography" and "Civics Education", but with a separate curriculum on "Ecology and Environment". Besides, optional topics on Environmental Education (Drinking Water; What Do You Eat; Using Energy at Home; Renewable Energy; Domestic Waste; Tropical Forest; The Impact of Global Warning...) were trialed with local studies, co-operative method, problem solving approach, commitment and action.

Environmental Education in higher education is included in relate subjects and with separate curriculum "Population and Environmental Education" in stage I of University Institutions. There are two deeper levels for Teachers' Training Colleges. Second level of EE in higher education is curriculum on Ecology and Environment in stage II for all Teachers' Training Colleges and third level with "15 days practice in nature" curriculum for faculty "Natural Science" and especially for faculty "Biology and Agriculture".

Masters degree on Population and Environmental Education was offered from 1992 in Hanoi Pedagogical University.

Activities on Environmental Education

1. **Greening program 91 - 95 for school network**: This programme was achieved in September 1995, and students have grown 15 million of trees for school network and communities. Two days February 5 and June 5 are very important for that activity.

2. **VAC Programme (V: garden, A: pool and C: breeding)**: to make eco-system balance, educational effectiveness and economic effectiveness. The such kind of the programme (93 - 95) in Hai Phong province was achieved. It opened the broad perspective of Environmental Education in school network.

3. **Local environmental study**: More and more popular for secondary schools the field trip activity of classes is combined with local study. It gives not only new scientific data, but also step by step raises capacity of building for students through local study report and commitment.

4. **Competition in Environmental Education**: There were competitions of art and song, decorative plant, bird (bird festival), journal and stamp. The competitions stimulated students and teachers in Environmental Education and motivated the whole community around the school to participate in the competitions.

5. **Mass-Media Advocacy in Broad Casting for Environmental Education**: a programme by radio every week, and television twice a week on local environment and environment of other countries is given by the national broadcasting station and national television station.

6. **Organisation of National Workshops/Seminars on Environmental Education:**

    1) Environment and Sustainable Development on 6 - 8 September 1995
    2) Environmental Education in School on 25 - 27 September 1995
    3) Environmental Protection Facilitators and Teachers' Training on 25 - 26 December 1995
    4) Greening School Network on 14 - 15 October 1996

Those workshops/Seminars prepared both teacher training and school activities.

7. Establishment of the New Centre for Environmental Education:

New Centre for Environmental Education was set up. Vietnam participated actively in the project "Learning for a Sustainable Environment" with four modules in trialing: "A whole school approach to environmental education", "Using the environment as a resource for learning", "Action research as teaching strategy in school and communities" and " Developing ecological concepts through systematic analysis of local environment". These modules were used in a mixture of pre-service and in-service courses in two junior teachers' training colleges, Hanoi Pedagogical University and for adult education. The local environment data used were update environmental situation of Vietnam (forest, mangrove, pesticide abuse and different aspects of pollution) and new approaches for teaching-learning process have been used.

Plan of Action by the Year 2000

1. Enhancing awareness on Environmental Education for community leaders and administrators.
2. Highlighting the value of modern personality that is concerned Environmental Education.
3. Establishing the Environmental Education Association and developing it into action.
4. Readjusting and developing the environmental education curriculum and extra-curriculum for teacher education both of pre-service and in-service training.

Appendix 2: Sample Completed Project Review Guide from the Philippines

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A. BACKGROUND

1. ***Indicate how you became aware of the project?***

   I am one of the module writers.

2. ***Indicate your reasons for offering to deliver this module.***

   I am part of a team who gives training workshops on environmental education mostly to teachers. This module will enrich the sessions we have been giving. Secondly, as a teacher, I strongly believe that education for a sustainable development is urgently important and ought to be learned by educators.

3. ***What knowledge or skills did you hope to acquire by participating in the project?***

   I wanted to learn new activities which I can use in our workshops in environmental education. I also hoped to learn other pedagogical principles in environmental education and curriculum integration.

4. ***What is the name of the module you decided to trial?***

   Experiential Learning in Environmental Education.

5. ***Why did you select this module to trial? For example, was it relevant to the curriculum you were teaching? Was it different from other professional development materials available to you?***

   a. I chose this module because I believe in experiential learning as an innovative approach in teaching, and practice it in my classroom teaching and in-service teacher training.

b. The module was relevant to the course the participants were taking, Teaching Science (a Graduate Course in an Early Childhood Education programme).

6. Please describe the circumstances or situation of the trial.

- I trialed the module as part of an in-service programme for teachers.
- The module was presented in one extended session — 3 hours.

7. Indicate any special conditions that affected or strengthened your delivery of the module. Then, say why these conditions were so helpful.

a. The number of participants (9) was manageable. They have been working together as classmates in the course for almost a semester; hence, they know each other well already. Their instructor scheduled a special session for this module trialing and the programme chairperson, Ms. Edith de la Cruz, herself a member of the team of module writers, gave an overview of the project and how they will be contributing to its success.

b. The participants were graduate students of Miriam College, a leading proponent of environmental education in the country. And the module trialing was partly held in the beautiful mini-forest within the campus grounds, perfect for an "experience outside of the classroom activity" specified in the module.

B. REVIEW AND ADAPTATION

1. What were the changes you made to the module?

a. Sequence of the three themes.

The adapted sequence:

- Introduction
- Theme II (Outdoor Experiences)
- Theme III (Using the Environment as a Resource for Learning Across the Curriculum)
- Theme I (Planning, Organisation, Risk Management)

b. Possum Picnic Activity

The adapted version: "Golden Snail Swirl"

- The "taggers" are designated as golden snails.
- The rest of the group are rice stalks.

- 2 controls introduced to reduce the golden snails — the "farmer" who throws a foam ball at a snail and the "duck" who tags a snail.

c. Procedure for the EOTC Matrix.

- Instead of doing the matrix, a discussion session was done to elicit answers. There was no need to go around the local grounds as specified in the module.

d. Procedure for the Risk Management Matrix.

- No small group discussion using Resource No.2. Instead, the whole group shared their views about Risk Management and Planning Your EOTC.

e. Material for the ice-breaker activity

- Instead of using small cards pegged on the back of the participants, I made paper headbands crowned on their heads. Hence, they can easily interact with each other without having to turn around to read the cards on each other's backs.

2. ***What were the major factors that caused you to make these changes?***

a. I noticed that the sequence of the activities of each theme would necessitate going back and forth between the classroom and the venue outside. The module also places a main theme, which requires sit-in discussion and listening, to a lecturette ahead of the theme on Outside Experience and the theme on Using The Environment which calls for outdoor activities. I re-arranged the order of the activities so that all lecturettes which needed the use of the overhead projector were put together and all the activities outside of the classroom together. Debriefings of all the activities were made immediately after each activity, inside or outside the classroom. I also placed the outdoor activities ahead of the lecturette sessions because I surmised the participants, knowing the title of the module, were expecting more EOTC activities than lectures inside the classroom. Considering the three- hour session scheduled for this workshop, I thought it was better to meet the central objective and apply the main strategy of this module, namely, to use the environment for learning, at the beginning.

b. The possum is not a familiar species in our local environment. However, a similar situation in the Philippines is the introduction of the Golden Snail in the rice farmlands. It was initially introduced as a cheap food source and its propagation as an income-generating enterprise for farmers. Soon enough it had become a pest thriving on the rice stalks of the farmers.

c. Since there were only nine participants, there was no need to break into smaller groups. We were not able to fill up the EOTC matrix due to time constraints. Instead, we went through the examples given in OHT 1 and in Resource 1.

d. Outdoor activities such as tramping or abseiling are hardly ever done as part of the academic curriculum in the Philippines. Our outdoor activities consist of more activities within the campus grounds and trips around the local or neighbouring community, which we call field trips. I have very little experience about nature treks or camping, much less preparing for such an activity. The participants who were early childhood educators hardly ever plan for such, too. Nonetheless, we still discussed the Principles of Risk Management and Resource 2 (Planning Your EOTC) and we cited parallel examples applicable in our field trips.

e. I think it is easier to interact with the cards seen up front rather than at the back. Putting it on the overhead still hides the cardholder's "identity" and allows face-to-face interaction.

3. ***Did any aspect of your professional circumstances make adapting the materials challenging? For example, did materials require translation, or were they unsuitable for the institution in which you work? Please explain your answer.***

None.

C. EVALUATION

1. ***To what extent did you find the materials innovative? Are similar activities being undertaken in your own country or institution? Please give examples.***

a. The material on the Principles of Risk Management is relatively new. Although our group has always planned outdoor activities in our workshops, we do not go through a step-by-step risk analysis.

b. A similar matrix for using the environment as a resource for learning has been mapped out in our institution. Although not as extensive as Resource 1, our matrix lists pedagogical themes and appropriate places and activities for its field trips through the different educational levels, e.g. nature appreciation for the elementary levels — a trip to the local zoo or a nearby national park.

c. Our school curriculum and a matrix for integration of environmental education in different subjects done by our group, Miriam-P.E.A.C.E. (Public Education and Awareness Campaign for the Environment) promote the use of the environment as a resource for learning. Recently, our group launched a series of modules for teachers, which contains activities following the experimental process.

d. In our teacher-training workshops, our group always plans interactive and experiential activities. A popular one, which our group designed is called "A Trade Fair in Asia". It simulates trading activities in Asia and leads to an analysis of its effect on the environment and the economy of the region and its countries.

2. ***What criteria did you use to evaluate the workshop?***

   The objectives of the module.

3. ***What formal or informal methods of feedback and evaluation did you use in the trial of the module? (For example, did you use a survey, focus group or interview? Did you discuss the workshop informally with the participants?)***

   I use a pre- and post-evaluation form with a rating scale indicating their degree of knowledge and skill of the key concepts of the module (based on the objectives specified in the module). The participants were also asked to write down any new learnings, the best and least liked activity, the usefulness of the module in their teaching, and any recommendations.

4. ***What data did you collect?***

   a. Based on the pre- and post-evaluation rating scale, the participants increased their knowledge and skill of the key concepts of the module after the workshop. (Refer to the eight learning outcomes listed down at the beginning of the module.)

   b. Based on their written responses, they enjoyed the activities of the workshop. They liked best the "Golden Snail Swirl", the ice-breaker activity, and had mixed reactions on the activity of Resource No.5 — some included it as one of their best, some mentioned it as the least liked.

5. ***What was the student response to the workshop content? For example, what improvements did they suggest, and what strengths did they identify?***

   a. The workshop strengthened their belief in the process of experiential learning. Through this process, learning becomes enjoyable and effective. They also became more aware of the advantages of using the environment as a resource for learning a concept in a particular discipline and, at the same time, learning about the environment. A participant said that the environment is largely an untapped learning resource and that many teachers still use the more traditional approach.

   b. Somebody mentioned about becoming more aware of the need to plan carefully any outdoor activity, which is often taken for granted. She cited experiences of a young student getting lost during a trip and getting hurt in the process.

   c. Another one mentioned about the importance of integrating environmental education into different subject areas. She gave some examples which she uses in teaching reading to Grade 6 students.

6. What was the student response to the methods used in the workshop? For example, what improvements did they suggest, and what strengths did they identify?

a. The participants enjoyed doing the activities. They said that their students will also enjoy them and at the same time learn about the environment. They also mentioned that they have been doing similar activities in different subject areas and that the activities presented in this module will be added to their list of teaching strategies. One participant was inspired to modify her curriculum that makes use of teaching for, in, and about the environment.

b. They suggested that more teachers be trained on the strategy of using the environment as a resource for learning.

7. Were the adaptation and trial an effective learning experience for participants? Why?

Yes. They learned new things and could make use of the activities in their teaching.

8. What do you see as being the strengths of the original module? For example, was it easily adapted? Were the instructions easy to follow?

Yes. Adapting was not difficult at all, and instructions were easy to follow. The reading and resource materials were useful.

9. How might the original module be improved, before being adapted by others?

a. I suggest that more examples and situations be given to illustrate the Principle of Risk Management. Also there are some terms in OHT 3 that are unfamiliar and not explained in the Background Information, like "risk shift" and "get-home-itis". These should be defined and illustrated by examples.

b. I suggested that Activities 1 and 2 of Theme I be put at the end (like the order in my adapted version). This allows the facilitator to focus on Themes 2 and 3 which I think are the major concepts of the module. Theme 1 activities, being lecture-discussion sessions, can serve as a summative activity.

10. Comment on whether the activities were manageable within the suggested time frame.

There is no specified time frame for the entire module. But I think the original module would need more time, especially if done with a bigger group. From my experience, some of the activities which asked the participants to move around were tiring. A short time to allow the participants to rest should be considered in timing the sessions. For example, after the adapted version of the "Possum Picnic", the participants were too exhausted to participate in the debriefing.

11. Comment on whether the resource materials were helpful in the delivery of the module.

Yes, the resource materials were helpful; but I suggest more background information on Risk Management. As I mentioned in No. 9, all terms should be defined and illustrated with example situations.

12. Will you plan to use the materials again? How might you change them before using them on another occasion in the light of your trial?

Yes. I would schedule a longer time-frame. I would make the topic on Risk Management an optional activity or a further reading material for the participants. I would focus more on the process of experiential learning and EOTC activities.

D. PROFESSIONAL DEVELOPMENT REFLECTIONS

1. What has (a) reviewing and adapting and (b) trialing and evaluating this module done for your professional development? For example, did you develop new ideas on the nature of environmental education?

a. As a teacher and trainer, it inspired me to think of new experiential activities to add to my lesson plans and workshops. Especially in our teacher-training workshops on environmental education, in-service teachers always look for new teaching strategies. It gave me new ideas to enhance my activities in integrating environmental activities in the subject that I teach, High School Social Studies, to allow more EOTC activities. Resource 1 on the matrix of EOTC activities gave me a lot of new ideas.

b. Trialing and evaluating the module has increased my skill in conducting workshops, especially in facilitating interactive activities. The resource materials gave me new ideas about processing and evaluating experiential activities.

2. Have you developed new additional activities as a result of using this module? Please describe them. How will you use these activities?

None. Maybe after more trialing.

3. Have the materials helped the teachers/student-teachers to develop their own thinking about environmental education? Please provide details.

Yes. Here are some of their responses.

a. I discovered that there a lot of possibilities in using the environment as a resource for learning. The environment can be used to teach many subjects and, at the same time, make them more aware of environmental issues.

b. Using the environment as a resource for learning is very helpful in teaching a lot of concepts. For example, in teaching adjectives — I will let my class go to the mini-forest and let them describe what they see around them.

c. Teaching environmental concepts through experiential learning is very effective. Especially for the developmental level of the students (early childhood) that we teach. Learning is enjoyable and easy.

d. Activities which have environmental themes are applicable also in other subjects, not only in science.

e. A new learning based from the activity, the "Golden Snail Swirl" is the effect of introducing a new species to an ecosystem. I was able to understand it very easily through the activity.

f. The environment can be used to teach certain mathematical skills, like visual discrimination and measurement. Math is best understood if related to experiences in real life. Using the environment is an effective tool and experiential learning allows them to do the learning for themselves. These methods at the same time inculcate awareness of the environment.

g. Through the different activities presented, I became more aware of the wonderful experiences and benefits that can be derived from an education in outdoor settings. Learning will be more meaningful and it will even foster love for the environment.

h. Using the environment as a "natural classroom" is an opportunity to learn about, in, and for the environment.

Appendix 3: Sample Completed Project Review Guide from Fiji

Introduction

The module — Using Indigenous Knowledge, Practice and Perspective in Environmental Education was trialled at Fiji College of Advanced Education (FCAE) in April 1996 for a pre-service programme. The target group were the first-year trainees from the School of Science. The module was presented as a part of a formal course during normal teaching time.

Selection of Module

This module was selected for it was relevant to the multi-cultural society of Fiji, which is known for its rich culture and traditions. This module was also relevant to the course already being conducted at FCAE. The science trainees with whom the module was tried out were not familiar with the "storytelling" approach, which is objective. The trainees deal mostly with cognitive and manipulative skills which do not allow development of attitudes and values. The module provided an innovative approach to introducing "storytelling" as a teaching and learning method.

Adaptations Made to the Module: Cultural Factors

There are two major ethnic groups living in Fiji. They are Indo-Fijians and native-Fijians. The module was adapted to give both the cultural groups an experience of finding out certain environmental-friendly practices still common in their society. This adaptation also provides an opportunity for the two ethnic groups to share views and understandings from their culture and traditions.

The following changes were made:

- Prior to the workshop, students were asked to find out about an existing traditional practice or legend which focuses on the environment.
- As an introduction to the module, two guest speakers were invited from both the ethnic groups, i.e. Indian and Fijian, to tell stories relating to the environment.
- After the introduction, the trainees were divided into groups to share their findings. Each member of the group told stories about the way our ancestors or the existing culture cared for the environment.

- Had discussion on two stories of the Pacific i.e. Legends of Fish and Mwem: First Fruits in Trunk. After the discussion, trainees highlighted certain practices in the rural areas which still care for the environment today.

The changes helped to localise the content which students were able to identify with. The local stories created a better impact and the trainees were able to understand certain practices.

Adaptations made to the Modules: Educational Factors

The topic bioprospecting and biopiracy should be known to the people of the Pacific. After all, indigenous knowledge is often stolen from the local people by pharmaceutical companies without any compensation. Once again it's the Western world which is benefiting by stealing indigenous knowledge and by creating seed banks. Students learnt for the first time about the intellectual property rights.

- An article from the local newspaper based on the stealing of indigenous knowledge was discussed. In Fiji, our traditional drink called 'Yaqona or kava' is now used in Europe to make a tranquilliser called KAVAIN. A lengthy discussion on bioprospecting and biopiracy was thoroughly enjoyed by the trainees.

Responses from Workshop Participants on the Module

The following criteria was used to evaluate the workshop:

a] Level of difficulty in comprehending the language;

b] Duration of the workshop;

c] Appropriateness of the content;

d] The methodology used in the delivery; and

e] Non-verbal cues from the participants.

The comments received from the focus group interview and informal discussion included:

- Trainees felt that the language was difficult to comprehend in some cases. For example, in understanding the concept of recognising a romanticised account.
- The workshop was too long and should be split into 2 × 2 hour sessions.
- The content of the module had a local context which made it interesting.
- Enjoyed the story telling session and the message was clear from the stories. It is an effective way to deliver information.

Recommendation to the Module Author

Since some countries do not have indigenous people it would be a good idea to include a subtopic on intellectual property rights. Include examples of 'neem' tree which was used in India for Ayurvedic medicines. Americans did research on that plant and found that it had natural herbicide properties. So now they claim they were the founders of that plant and are refusing to pay the Indians.

The Personal and Professional Benefits

There are a number of reasons as to why I volunteered to participate in this project. These are:

- Broaden my knowledge on diverse methods practised by indigenous people in looking after their environment.
- To build a resources in environmental education for future use.
- Availability of references to be used as the need arises.
- To build professional contacts.
- Adds to the repertoire of teaching methods.

CONCLUSION

The module was informative and of a high standard. It focused on "story telling" as a teaching method. This teaching method easily motivates the students who took a lot of interest in the discussion. I'll be using the module again in the in-service teacher training programme. To localise the module, a number of local issues will be incorporated.

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